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THE IRON AGE

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DECEMBER 1, 1938

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Old and New Meet in Totalitarianism

THERE is quite a vociferous group of young intellectual radicals in this country, some of them in high places, who believe that our Constitutional Government is old fashioned. They want us to become up-to-date, like Russia, Germany and Italy and adopt the totalitarian principle.

These three countries have new model governments which have been designed and built since the World War. They are efficient governments, designed for speed and quick movement. People in these modern countries lose no time in debating questions of public policy, as in an old fashioned Democracy. There is in each of these countries one ruler and one voice. That voice says: "Do or die" and you do or you die.

There is also another country with a new fashioned Government that is much in the news today. It is Japan. Its form of Government also is totalitarian, even though it is an old fashioned military despotism.

Strangely enough, the intellectuals in Washington and elsewhere who would have us throw away our slow and cumbersome Democracy in favor of a redesign based on the modern nations such as Russia, Germany and Italy never mention copying Japan. Yet to all intents and purposes, as far as the people are concerned, these modern governments are identical with Japan and with the dictatorships which existed in the absolute monarchies of the world before revolution established democracies and republics.

Stalin, Mussolini and Hitler were all socialists to begin with. And socialism originated, abroad, as a protest against the lack of personal liberty in absolute monarchies. Is it not strange that these disciples of socialism, once in power, have gone the absolute monarchs of the past and present one better in the way of one-man rule?

J. H. VanDeventer

HAIRLINE IMPERFECTIONS

The Nature of Hairlines And Methods for Their Detection In Semi-Finished And Finished Steel Products

By CARL L. SHAPIRO

Consulting Engineer, Syracuse, N. Y.

DURING the last decade, the question of surface finish has become of paramount importance. This fact may be attributed primarily to the advent of the magnetic type of non-destructive test, which is exemplified by the magnaflux test, and to the tremendous strides that have been made in the aircraft and automotive industries. These two factors have made the steel industry conscious, more so than ever before, of the fact that minute imperfections of hairline appearance and proportion have always been present in steel and steel products and are the basic cause for the present—it may be said—"hairline period" in the art of high quality steel making.

These hairline imperfections, which have been encountered both by the steel producer and the consumer, are extremely important at this time because it is not known what actual effect these minute discontinuities have upon the service performance of highly stressed parts. It is this uncertainty, and the knowledge that a certain amount of these imperfections have to be expected even though an intelligent interpretation of their relative seriousness is not available, which prompted the author to attempt to cover the subject matter both from the angle of defining the term "hairline imperfections" and to briefly describe the prevailing methods employed in the detection of these defects in semi-finished and finished steel products. At the same time, an effort has been made to develop the relative merits of the standard test methods which are now employed by the various steel manufacturers and consumers.

During the course of this work, the author corresponded with many of the leading metallurgists in America and Europe by means of a questionnaire, intended to ascertain their views, opinions and experiences on this problem. It is wished at this time to acknowledge and thank these gentlemen for their cooperation, and it is regretted that space limitation prevents the presentation of their gratifying replies.

TABLE I

Frequency and Severity Rating per Hairlines

Test Piece	Under ⅛ in.	⅛ to ¼ in.	¼ to ½ in.	Over ½ in.	Frequency Rating	Severity Rating
1	7	0	0	0	7	7
2	4	1	0	0	5	6
3	5	4	4	3	16	37
4	6	1	1	0	8	11
5	8	4	3	6	21	49
6	5	6	2	2	15	31
7	5	3	2	5	15	37
8	7	3	2	0	12	19
9	8	0	0	0	8	8
					107	205

By supplementing the results of the questionnaire with experimental work, it is possible to classify and define all minute imperfections in steel as follows:

(I) A hairline imperfection may generally be defined as a discontinuity, crack or rupture of hairline dimensions in metal.

(II) A seam of hairline proportions (hairseam) is defined as a solid elongated non-metallic discontinuity due to the presence of non-metallics or inclusions, etc.

(III) Streaks, ghost lines, dendrites, etc., are considered as solid heterogeneities of a metallic or non-metallic nature, or both, within the material, due to the segregation of an element or elements, solid solution(s) or compound(s) other than non-metallic inclusions or hairseams.

It is not unusual that in many instances regular surface or sub-surface cracks or seams, ghost lines, etc., the causes of which do not need further discussion at this time, are often improperly termed "hairlines," especially if the imperfections are rather minute. As viewed from the author's standpoint, actual hairline defects (Figs. 1 to 5) are best described as minor internal discontinuities of varying severity representing a typical condition of the melt. While the severity of this hairline condition may vary from in-

got to ingot and even from the bottom to the top of individual ingots, it must nevertheless be considered a characteristic condition of a heat of metal, which may be either minimized or accentuated by suitable or improper subsequent processing practices. However, the problem is, primarily, and always will be, a matter of melting procedure.

During the course of this investigation, attempts were made to differentiate between those hairlines which are actually formed in the melting, pouring or during the solidification of the steel; that is, during the liquid state, and those defects such as strain cracks, ruptures, flakes, etc., which are known to be introduced in the material while it is in the solid state during the hot or cold working, heat treating or machining of the steel. To determine these factors and, if possible, the cause of hairline defects, series of 6-ton basis electric furnace heats (Heroult type) of low carbon nickel, chrome-nickel, and chrome-vanadium steel were processed under carefully controlled furnace practices, including the selection of scrap materials, adjusted melt-down and refining periods, temperature control, time of alloy additions, time and type of de-oxidizers, etc.

These heats were completely investigated both in regard to their characteristics and quality at the plant as well as to their acceptability and service performance in the finished product. The test methods employed at the mill in determining the properties of these melts include a hairline test inspection of top, middle and bottom sections of the second, middle and last ingot cast, macro etch tests of the top, middle and bottoms of all ingots, the determination of the nonmetallic cleanliness of the material, the McQuaid-Ehn grain size rating, and a microscopical examination for ferrite banding. In the customer's plant, the finished products made from these heats were primarily inspected by the magnaflux test.

A brief description of the various test methods which were employed are given in the following paragraphs:

(a) Taper Test and Stepdown Hairline Inspection Method: Hot rolled specimens of 1¼ in. round by 12 in. long were smooth machined, finish ground and polished to a 10 in. length taper from a 1⅛ in. diameter (discard of 1/16 in. on a side) to one inch. The specimens were etched for two minutes in concentrated hydrochloric acid at 180 deg. F., washed, dried in alchol and inspected by means of a binocular microscope at a magnification of 20 diameters. The length and total number of the observed imperfections were then considered and the results expressed in terms of a frequency and severity rating, which is based upon the following:

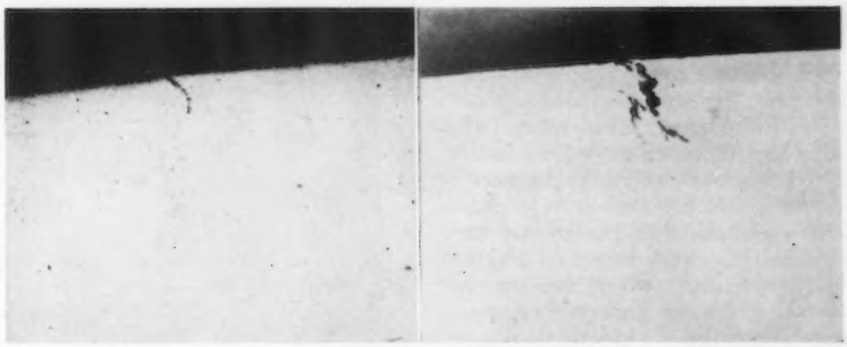
(I) Frequency Rating:—Average number of hairline imperfections per specimen.

(II) Severity Rating:—Average imperfection value per specimen obtained by weighing each hairline by a severity factor varying according to its length as follows: Under ⅛ in. length, severity factor X1; over ⅛ to ¼ in., severity factor X2; over ¼ to ½ in., severity factor X3; and over ½ in. length, severity factor X4.

To illustrate this procedure, assume that nine specimens show the imperfections listed in Table I.

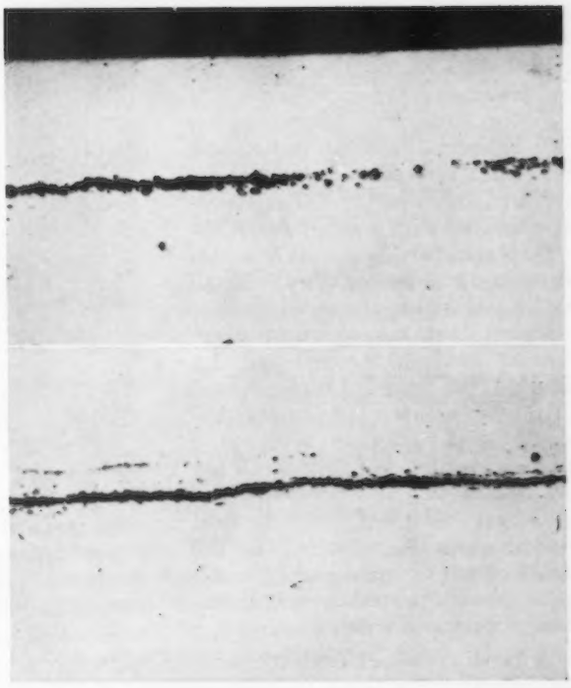
The data shown in Table 1 would classify the hairline condition of the heat as having an average frequency rating of 11.9 with a severity rating of 22.8. Subsequent to this taper test inspection, the specimens were machined into step-down test pieces by making three steps of approximately 3 in. length and ⅛ in. variation in diameter. After a fine finish grinding of the surface of these steps, the samples were lightly etched in concentrated hydrochloric acid at 180 deg. F., washed, dried and inspected under a magnification of 20 diameters. While the merits of the taper versus the step-down test method will later on be the subject of discussion, it may be stated at this time that on a commercial basis the taper test method should be given preference to the stepdown test method except in cases where the ultimate finished size of the part for which the material is to be used is definitely known.

(b) Macro Etch Test: Cross-sections of annealed 3 in. square billets as well as of the finished bar stock are given the standard A.S.T.M. 1:1 hydrochloric acid etch. After washing and drying, the etched disks are



ABOVE

FIG. 1.—Cross-section of a fine (at the left) and a coarse (at the right) hairline extending inward from the steel surface. Both views at 100 diameters.



AT RIGHT

FIG. 2.—Longitudinal sections of sub-surface hairlines. At 100 diameters.

inspected by means of a binocular at a magnification of 15 diameters for any general or localized acid attack.

(c) Non-Metallic Inspection: Hardened full cross-sectional specimens are prepared for non-metallic inspection by dry polishing, which consists of rough grinding through No. 320 emery paper (No. 40, No. 120, No. 180, No. 320) and finishing on No. 00 and No. 000 French emery paper, followed by a 20-sec. polish on a wet wheel covered with levigated alumina. After polishing, the specimens are examined microscopically at a magnification of 100 diameters.

(d) McQuaid-Ehn Test: This well known test for the determination of the austenite grain size rating of steel is carried out in accordance with the recommended A.S.T.M. practices, with the added precautions of giving all the specimens the same amount of mechanical hot work reduction and a prior heat treating which consists of a normalizing and annealing operation.

(e) Test for the Determination of Ferrite Banding: Representative speciments of 1½ x 1 in. are heated at 1650 deg. F. for four hours and slow cooled to 600 deg. F. at the rate of 25 deg. F. per hr. After polishing in a longitudinal direction and etching lightly in 5 per cent nital, the microstructure is examined at 100 diameters and compared with a set of standards.

(f) Magnaflux Test: While this test method will be described in detail later in this article it suffices to state at present that the specimens were inspected by both the wet and dry methods. The results obtained showed that these tests are not very practical for the steel maker to apply as a routine inspection test method on bar stock, etc., which is afterwards processed by a fabricator, since the final product which is subjected to the magnaflux test is influenced by many factors which the steel producer cannot anticipate nor control.

The results obtained from the foregoing investigation seem to indicate very definitely that true hairline imperfections are directly traceable to the melting practice and are controlled by the gas (oxygen, carbon monoxide, carbon dioxide, hydrogen, nitrogen) and non-metallic compound content of the melt, and depend upon the methods which are employed during the meltdown and refining, the deoxidation, time of alloy additions, temperature control of the heat as well as the speed of pouring and subsequent solidification in the ingot (ingot size and shape, thickness of mold wall, etc.). It is not wished at this time to discuss further the influence of the aforementioned individual operations, but it is well to remember in the control of hairline imperfections in steel, the well known axiom of "melting hot and pouring cool."

The effect of various other elements, such as carbon, silicon, chromium, molybdenum, nickel, etc., upon the hairline characteristics of certain melts, was also investigated. However, to date this work has not progressed sufficiently to warrant further discussion. Nevertheless, it may be stated that due to their chemical composition, certain grades of steel, especially low carbon nickel and chrome-nickel types such as 2512, 3312, etc., as well as highly alloyed steels are more susceptible to a poor hairline condition than steels of less complicated analytical makeup and, in the before mentioned steels, it is more difficult to control the degree of freedom from segregation, including banding, non-metallics, porosity, hairline characteristics, etc.

Test Methods for Minute Imperfections

The importance of using a commercial test method of satisfactory sensitivity for the detection of these hairline imperfections is obvious and does not require further explanation. The various test methods which usually are employed for routine inspection may be classified under the headings: (a) Destructive tests; and (b) non-destructive tests.

It is natural that the non-destructive method is primarily adapted to the inspection of finished articles; whereas, the former is of greatest importance in the inspection of semi-finished products, as for instance bar or billet stock, as it is being shipped from the steel producer's plant.

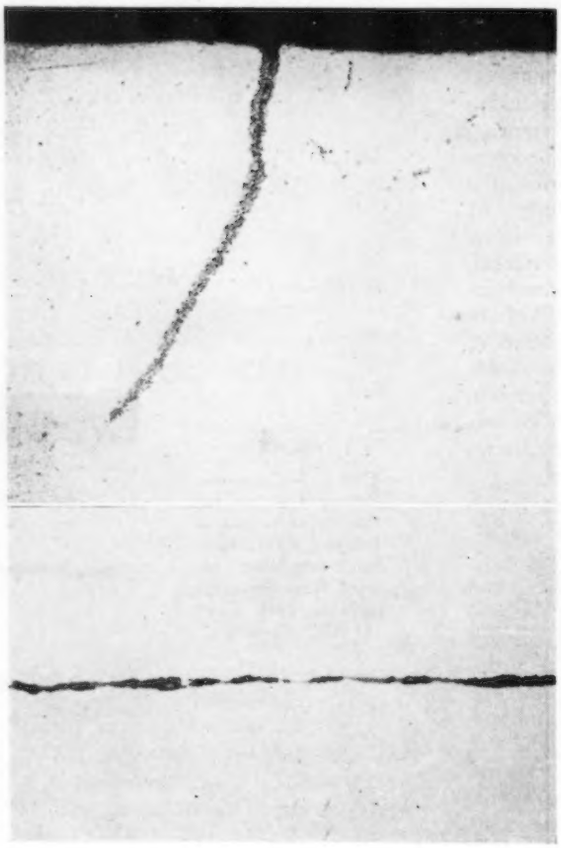
While the scope of this paper permits only a description and evaluation of the most important of the destructive and non-destructive methods, it may be of interest to draw attention to the other available tests by tabulating them as follows under their respective classification.

DESTRUCTIVE TESTS

Macro hot acid etch test.
Hardened fracture test.
Microscopic test for non-metallic inclusions.
Taper and stepdown hairline test.

NON-DESTRUCTIVE TESTS

Visual examination.
Magnetic tests.



AT LEFT

FIG. 3.—Cross-section of a seam (above) and longitudinal section of a seam (below). At 100 diameters.

o o o

AT RIGHT

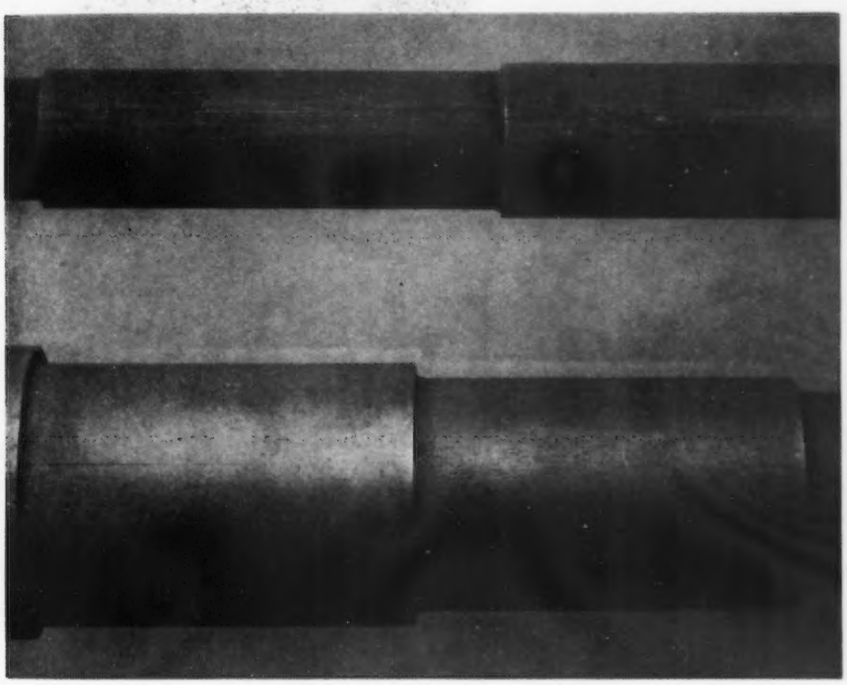
FIG. 4.—Bars of 0.889 in. (upper) and 1.5 in. (lower) Cr-Mo steel from which 1/10 of the diameter has been removed at each step. The upper bar shows numerous fine hairlines; the lower bar reveals a large hairline. The bars were etched 20 min. in boiling 50 per cent HCl, and shown here natural size.

(a) Magnaflux test.
(b) Magnetic permeability test.
Electrical tests.
Magnetic electrical tests.
Radiography.
(a) X-rays.
(b) Gamma-rays.
Visual examination.
(a) Polished surface.
(b) Coated surface.

DESTRUCTIVE—NON-DESTRUCTIVE

Micro-chemical examination.
(a) Bauman prints.
(b) Nissmer prints.

The procedures of the most outstanding of these test methods, especially as they pertain to the commercial detection of hairline imperfections in steel, will be presented briefly.



Destructive Tests

MACRO-ETCH: The macro hot acid etch test procedure as well as the interpretation of the results obtained are described very thoroughly in the *A.S.M. Metals Handbook* (1936 edition, pp. 573-579) and, therefore, it is unnecessary to review this type of destructive test in detail. The test is comparatively simple, the only difficulty being in the possibility of over-etching. However, the routine procedure of this examination requires certain special facilities for the preparation of the specimen (saw cutting, etc.) and a suitable setup for the hot acid bath. With special care being exercised in the preparation of the samples and in the judicious timing of the hot acid attack (to prevent over-etching), this method may be classified as one of the outstanding and most reliable means for the detection of hairline imperfections in steel. These minute imperfections which, aside from the common defects such as pipe, cracks, flake and objectionable segregation, ingotism or dendritic pattern, may be recognized by a small, localized pinhole acid attack, are most readily observed by the use of either a 1:1 HCl or preferably a 3:1:4 HCl: H_2SO_4: H_2O etching solution at 160 to 180 deg. F. To facilitate the inspection of the etched specimen for hairline imperfections, the use of a 10 or 15 diameter power binocular has been found to be of material aid.

The hot acid etch test, being definitely a destructive test method, is most useful for the inspection of semi-finished steel products for instance, for preliminary and finish inspection of billets and bar stock at the steel plant, and for acceptance test purposes on incoming steel by the consumer.

MICROSCOPIC TEST FOR NON-METALLIC INCLUSIONS: The basic principle underlying all microscopic examinations for non-metallic inclusion content consists of a careful dry polish preparation of representative longitudinal specimens (hardened condition is recommended) and a microscopic examination at 100 diameters. The inclusions observed may be reported by either (a), the general overall condition which defines and describes the number, size and form of the individual types of non-metallic compounds, or the segregation throughout the entire specimen under observation or, (b) the inclusion count method which estimates the number and surface area of the inclusion per unit area of the specimen.

The results of a careful microscopic non-metallic examination of representative specimens are most useful in the quality characteristic evaluation of a heat of steel. Moreover, whenever this examination shows the presence of so-called stringers and groups of inclusions arranged in chain-like form, it may be taken as an indication that the hairline frequency and severity rating will be high. Yet, the reverse is not true, for exceptionally clean metal, practically free from non-metallics, is often prone to exhibit inferior hairline characteristics. In general, it has been found that material whose microscopic non-metallic examination shows a reasonable number of small, finely divided and evenly distributed non-metallics proves to be most satisfactory from a hairline imperfection standpoint.

Summarizing briefly, it may be stated that the interpretation of any microscopic inclusion test is only of real value in the determination of hairline imperfections when it is used as a supplement to the hot acid etch test.

TAPER AND STEPDOWN HAIRLINE TEST: The taper or the stepdown hairline test procedure, especially when supplementing a hot acid etch and microscopic non-metallic examination, is probably the foremost means under the classification of "Destructive Tests" for the determination of the hairline condition of a melt.

The preparation, the examination and the evaluation of the results of the taper and stepdown tests have already been described, and it is only through experience that the relationship between these two types of tests with the magnaflux test can be established.

In both types of tests it is an absolute requisite to obtain truly representative test specimens. The taper test modification is usually best suited for preliminary test purposes at the steel mill, whereas, the stepdown method is more adapted to the finish acceptance testing of bar stock, especially where the dimensions of the ultimate application of the material are known. Due to its tapered condition (usually ⅛ in. in 10 in.), the

examination of a taper hairline test generally reveals a greater number of smaller hairline imperfections than the stepdown specimen. The number and size of these defects are determined by the tapered slope of the test specimen, and in order to observe a hairline imperfection in its entirety in the normal taper (⅛ in. per 10 in.), a defect of ½ in. in length must possess a depth dimension of at least 0.006 in. On the other hand, the stepdown specimen will reveal approximately the full length of all imperfections occurring on the particular surface of any individual steps.

The reason for the author's preference of the tapered over the stepdown specimen is the fact that a careful examination of the former will not only give results as to the number and apparent length of the imperfections, but will also indicate to some extent the depth dimension of the observed lines.

Ed. Note: The concluding half of this article will appear in the near future. The author will describe the various non-destructive tests for detecting and examining hairlines, and will also summarize all his observations and conclusions.

o o o

FIG. 5.—Two-inch steel ball with visible hairlines. Etched in hot 50:50 muriatic acid to show hairlines more clearly. Magnified two times.

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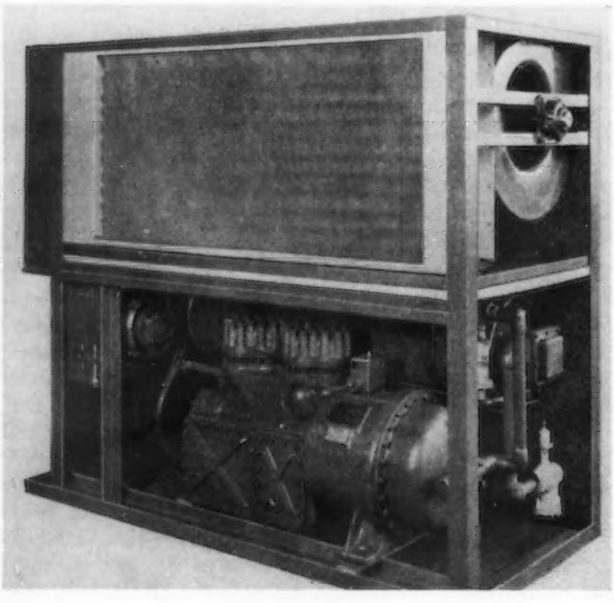
Westinghouse Broadens "Packaged" Air Conditioning Line

A COMPLETE line of "packaged" self-contained air conditioning units for commercial establishments, ranging in capacity from 1 to 15 tons and in combinations up to 30 tons has been announced by the Westinghouse Electric & Mfg. Co. Three of the units are of central system type and four are for installation within the conditioned space.

Eliminating the hazards of refrigeration-cycle installation, all that is necessary for operation are power, water and drain connections. The units are designed to occupy a minimum of floor space and can be carried through a 3-ft. door opening. The largest measures only 2 ft. 10 in. by 6 ft. 6 in. deep and is 5 ft. 4 in. high. Light weight, obtained through compactness and elimination of installation material, is an outstanding feature. Five models have been added to complement and complete the Westinghouse line of self-contained units, which are now available in 1, 2½, 3¾, 6, 7½, 10 and 15-ton ratings. These units may be combined to provide multiples of the given ratings, providing a wide range of capacities for commercial installations up to 30 tons.

Hermetically sealed compressors are employed in the new units. Two switches permit flexibility of operation; one controls the entire cooling mechanism and the other the blower motor so that air circulation may be enjoyed when cooling is not necessary. An all-steel welded form of cabinet assures permanent rigidity.

The units of the new line are easily adapted to winter air conditioning, by installing in the cabinets the necessary accessories such as heating coil and humidifier, year round air conditioning is available.



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INTERIOR view of new 15-ton Westinghouse Unitaire. Compactness is a feature, the unit occupying floor space of only 2 ft. 10 in. by 6 ft. 6 in. This and other units of the new "packaged" line are easily adapted to winter air conditioning, and may be used in multiples to provide capacities up to 30 tons.

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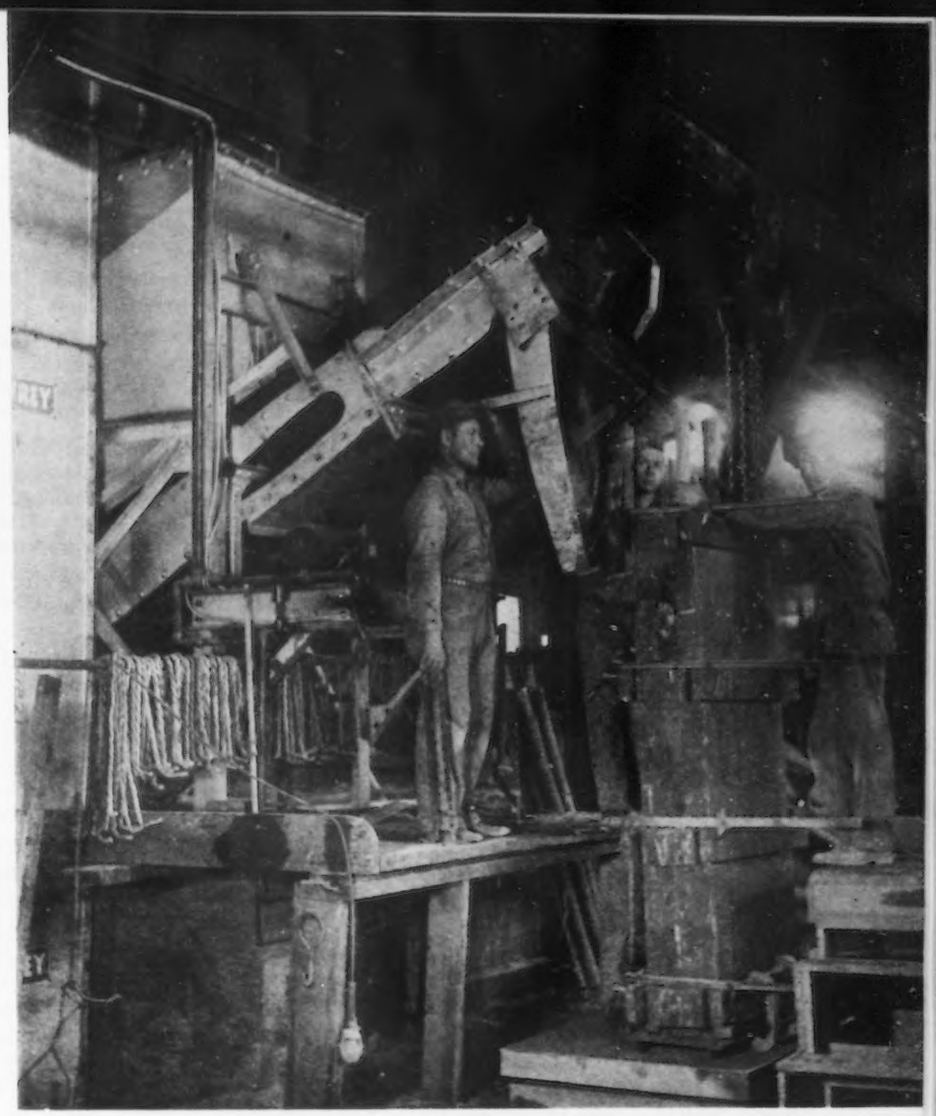
Molding Materials for Non-Ferrous Metals*

o o o

By FRANCIS W. ROWE
David Brown & Sons, Ltd., Sheffield

o o o



THIS view of the Randupson molding process at the Vulcan Mold & Iron Co. shows a final mixture of sand, cement and water as it falls into the molding box, which is in turn supported on a Hermann jolt machine to supplant hand or pneumatic ramming. o o o

THE subject of molding materials and methods for non-ferrous alloys is not one which appears to have received the treatment from technicians in the past which it deserved. Even though a fair amount of published literature is available on detailed phases of non-ferrous foundry practice, there is very little which correlates the whole, or enumerates the various fundamentals which govern the choice of one or other of the multitudinous methods or variations possible.

It sounds platitudinous to repeat that the object of any non-ferrous founder is to produce sound and homogeneous castings from various metals and to ensure at the same time that the physical properties of the alloy in the casting shall be the best of which that alloy in the cast condition is capable. To achieve both these aims in even the simplest shapes is a much more difficult job than many founders and most engineers realize.

Could anyone undertake tomorrow to cast a block, 6 in. square in any alloy which he could guarantee would be 100 per cent sound and homogeneous, and whose grain size, density and mechanical properties in every case reached the maximum of which that alloy was capable in the cast condition? The author doubts it, and he for one would not care to try. Many founders could produce an apparently sound casting of reasonable density and high mechanical properties, but in many respects it would not be a 100 per cent casting. Howbeit, such is obviously one ideal.

There is no doubt, however, that non-ferrous foundry practice has progressed enormously even in the last two decades, and it is quite generally known how much the improvement in molding materials and practice is due to a greater knowledge of metals.

The most common material for molds for non-ferrous alloys no doubt is and always will be natural bonded siliceous sands, used either in the moist condition as prepared for molding, or subsequently dried before casting. In recent years, there has been some substitution of natural sands by silica sands whose natural lack of bond has been replaced by the addition of colloidal clays such as bentonite, a small proportion of which gives a very high green sand strength—higher than would be permissible in a natural bonded clay sand, on account of the low permeability to gases which such natural high clay content sand would possess.

The use of silica sands bonded with various resins, oils, gums and molasses has been common in foundry practice for the last 30 years. Such mixtures when dried have many advantages and on account of these, some extension has taken place lately in their use for molds as distinct from cores. In the field occupied by molds made from sand, easily the most striking development in recent years is the patented cement bonded sands. This process, originally developed for iron and steel castings has in the last two*

*Abstract of lecture presented before the Midland Metallurgical Societies, Birmingham, England, Oct. 13.

years made rapid strides in the non-ferrous metal industry both for aluminum alloys and the bronzes and yellow metals. The basis sand is a high purity silica sand mixed with ordinary Portland cement and definite proportions of water. The resulting mixture is air setting and gives molds of extremely high permeability and great strength—of such strength that the ordinary box parts used to enclose normal sand molds are not necessary.

For many reasons, the sand mold possesses many disadvantages for non-ferrous castings, and to overcome these the metal mold has been used for many years for those parts which by reasons of shape or the quantity required are adapted to such a method of production. In a certain limited field also, development in the way of centrifugal casting has taken place in recent years to overcome the known defects and disadvantages of the normal sand mold.

Methods Compared

In order to review generally these various mold materials and the methods connected with them, the author proposes to split into two broad fields the advantages and disadvantages of each method of molding as regards (a) physical properties, metallurgical properties and soundness of the resultant casting, and (b) cost and rapidity and ease of production. The two things are not necessarily correlated, as one may go to a certain mold material in order to reduce costs or one may take it for other reasons whether the cost be greater or less.

In commencing, it may be stated as a fairly exact generalization that the more rapidly an alloy is cooled in the mold, the higher will be the density, hardness and general soundness of the casting. While exceptions undoubtedly exist, this holds for all but special cases. The rapidity of freezing of any one casting in a mold fairly obviously depends on two things — the thermal conductivity of the mold material and the temperature at which the metal fills the mold. This, generally known as the casting temperature, is controllable within certain limits, and it might be thought by the uninitiated that the minimum casting temperature needed to completely fill the mold would be the best to employ in most cases. However, in practice this does not always prove true, as imperfections in molds and mold materials are such that less sound castings may result from the employment of a very low casting temperature than one somewhat higher, and it is impossible for this reason to lay down dogmatic rules as to the best casting temperature for any particular alloy or particular class of casting.

As regards the mechanical properties of non-ferrous castings in general, it can safely be said that in non-ferrous foundry practice more castings suffer from high casting temperature than low, and greater attention to molding technique and particularly to runner and riser practice would permit lower casting temperatures to be employed and therefore quicker freezing of the metal and generally higher density and physical properties. Even other advantages follow in its train, two of which are worthy of some slight mention. The dangers of incorrect melting practice for any non-ferrous alloy are too well-known for further detailed examination to be given. This has been the subject of a great deal of discussion during the last ten years.

One of the dangers and inevitable results of melting any alloy is the absorption of gases, and the amount of gas absorbed rises enormously with rise of temperature of the metal above its freezing point. Usually, and correctly, a lowering of the average casting temperature means a lowering of the temperature to which the metal is raised prior to pouring, which in its turn lowers the amount of gas absorbed, besides lowering oxidation or volatilization losses. Secondly, the gas which is inevitably absorbed by an alloy is liable to be given off at the moment of solidification unless special inhibitors are employed or freezing is very rapid. Therefore pinholing or similar troubles in alloys are less, the more rapid the freezing, and therefore the employment of the lowest practicable casting temperature has helpful effects apart from the lower grain size and higher density. Obviously from the point of view of thermal conductivity, the sand mold is at a distinct disadvantage, and where the piece to be cast lends itself to the use of a metal mold, such is usually preferable. The disadvantages of sand molds in this direction are much greater where the castings are of appreciable mass. In the case of very light sectioned castings, the advantages of the metal mold may be confined to quicker or cheaper production, or greater accuracy and sharpness of the resulting castings.

A frequent practice in non-ferrous founding is to use a mold constructed in such a manner that a differential rate of freezing takes place in different parts of the casting, usually to compensate for differences in mass or sections of the castings, or to ensure great soundness or hardness at vital points. This of course is the method known as "chilling" where material of high thermal conductivity usually of steel or cast iron is incorporated in the sand mold at the points where such densening is required.

Steel or cast iron chills of a mass varying with the effect required are more usually employed, but the use of copper or graphite are for increasing or decreasing the differential between the chill and the sand. Both have been employed for special jobs with marked success not attainable by the use of cast iron or steel alone. Even with the use of chills however, sand molds do not give results equal to those obtained from metal molds and though their use is inevitable in a great many cases—particularly in the high melting point alloys—efforts should be directed always in the direction of securing the highest thermal conductivity in sand molds by putting runners and risers in such positions and of such dimensions as will enable a low casting temperature to be used, and by using chills on the thicker portions of the castings or at points where great soundness is essential.

Randupson Process

In passing, it should be mentioned that one of the minor advantages of the Randupson process of cement molding is that the molds have a definitely higher thermal conductivity than ordinary sand molds. This is obviously a trend in the right direction. While in no way comparable to a metal mold, the difference as compared with ordinary binders is quite noticeable.

Centrifugal casting in some form or other has been practiced for nearly 100 years, but so far as records go, the firm with whom the author is connected, pioneered and commercialized the vertical axis mold and the methods used for gear wheel blanks and similar parts. For reasons outlined previously, the advantages of rapid freezing and a metal mold have been known for a great length of time. Metal molds bring some disadvantages since high density in the metal is accompanied by high liquid shrinkage, and, where freezing is rapid, extra provision for feeding must be made to compensate for the heavy shrinkages. This is a difficult matter in metal molds and may result in some of the inherent advantages of the metal mold being offset by the increase mass of the castings, owing to the heavy feeder heads. In centrifugal casting,

however, the action is such that metal is being continually fed by centrifugal force into the freezing castings and, providing conditions are right, automatically compensating for the liquid shrinkage.

Another advantage of centrifugal casting is one which is not usually anticipated. It is well known that fine grained castings have usually more desirable mechanical properties than coarse grained ones. The constant vibration and agitation of centrifugal castings during the whole period of solidification prevents the growth of large crystals, with the result that the casting is even finer in grain than a stationary casting made under similar conditions, that is, as regards mass and casting temperature. Another advantage of centrifugal casting is that the difference in physical properties between a small casting and one of large mass is by no means so large as in sand or even in chilled castings. It is, of course difficult and expensive to obtain data on this point since bronze castings of the order of one-half to one ton in weight are expensive to cut up.

While most of the statements given so far regarding centrifugal castings refer to castings cast in molds with a vertical axis, similar results are obtained on the horizontal axis mold which, however, is more limited in configuration of the parts which can be produced, being largely confined to concentric bushes and the like, flanged or otherwise, but with plain bores. As illustrative of the practical advantages accruing from such methods there are many authentic records of an increase in life and load carrying capacity of 30 to 70 per cent over sand castings of similar composition, apart from such obvious advantages as much less variability between one casting and another.

Turning to some discussion on cost, a field is entered in which it is difficult to generalize. Small light castings, where the quantity is not sufficient to justify a metal mold or the alloy or shape of the casting is not one which lends itself readily to such production, will continue to be made by the green sand method of molding. For cheapness, and ease and rapidity of molding, it is hard to beat. Where important castings of anything above the lightest weights are concerned, most bronze foundries prefer a dry sand mold on account of the greater strength and reliability of such molds. With the increasing use of sand control, both as regards grain size, permeability, moisture content, etc., and in particular with the advent of sands bonded with colloidal clays, there is no doubt the field for green sand work could be increased. The green sand mold possesses undoubted advantages of giving sharper casting with a smoother skin and less flash, and thus less fettling costs, and its extension to more important work by the use of synthetic sands, promises a very favorable field. The advantages of a properly made synthetic sand are that the permeability is greater and more regular than a normal green sand, and that a much greater strength can be obtained.

Owing to its revolutionary and special features and the rapid inroads it is making in the non-ferrous industry, the author proposes to make rather fuller reference to it than has been devoted to other and better known molding methods and materials. The process is the invention of a French engineer and has been developed over the last six years in France. During the last few years it has spread abroad and foundries in every country of Europe and the United States are using it for all types of castings in every type of metal. Cement sand as a medium for cores had been proposed and tried as far back as 1898, but, owing to inappreciation of the fundamental scientific principles of its use, was never extensively used, and was commercially abandoned for a period of 30 years, until M. Durand of the Cie. Randupson, investigated the scientific principles and commercialized its use. Properly made cement sand molds have a much higher permeability than any other type of mold and possess extraordinary strength, even in very large masses.

Primary Hydration Only

As mentioned previously, the basis sand is a silica sand of high purity, containing about 97 per cent silica and upwards, and of a grain size determined for the class of work being made. This is mixed with from 4 to 13 per cent of ordinary cement, according again to the type of casting and metal, and sufficient water is added to ensure primary hydration of the cement only. This is an important factor. If water is added sufficient to completely hydrate the cement, then the permeability of the finished mold is very seriously reduced, and the material is unsuitable for molds as it resists the passage of gases. Owing to the high strength of the finished molds, ordinary cast iron or steel box parts are not used, but wooden chassis are used to ram the molds in, and these are withdrawn with the pattern or when the pattern is removed. The process in this respect corresponds therefore to the all-core method of molding. Molds, during the process of ramming, are suitably reinforced with straight irons of ¼ in. to 1 in. diameter, according to the size of the mold, and if the mold is of sufficient size to need crane handling after it is set, staples are embedded for this purpose.

One of the greatest advantages of the process is the speed with which molds can be rammed. The usual molding time is from 20 per cent to 60 per cent of that required by ordinary methods, the greatest saving being with the largest and most complicated molds. After ramming, the pattern is withdrawn in the usual manner and the mold finished and set aside to set. This setting takes place in the open at normal temperatures and takes from 24 to 72 hr., according to the size of the mold, the precise mixture and type of sand, and the atmospheric conditions of the shop. Setting proceeds only slowly at temperatures below 45 deg. F., but with great rapidity at 60 deg. F., and above. Most molds are sufficiently set to lift by their own hooks or staples after 24 hr., but in large molds the moisture is not thoroughly absorbed until 48 hr. have elapsed.

For steel, all new sand is used for facing on account of the high refractory properties desired, but for iron, bronze, brasses and light alloys, all old reconditioned sand can be used. For steel, no wash or paint is required, but for other metals, a coating of blacking or other type of coating is usually employed, and applied after setting to ensure a good skin.

The two or more portions of the mold are put together and clamped in any suitable manner. After casting, the mold is broken up and the sand passed through a crusher and stored ready for re-use after, of course, adding further proportions of cement and water. The disadvantages of the process should be briefly enumerated: (a) the sand has no green bond strength, (b) the time required for air setting is usually 48 hr., (c) the sand must be used in from 3 to 5 hr., and (d) all sand must go through the mixing plant both originally and for reconditioning.

The advantages, however, for work to which it is adapted, far more than outweigh these disadvantages and the savings in overall labor costs are particularly striking, apart from the tech-

(CONTINUED ON PAGE 75)

Mechanical

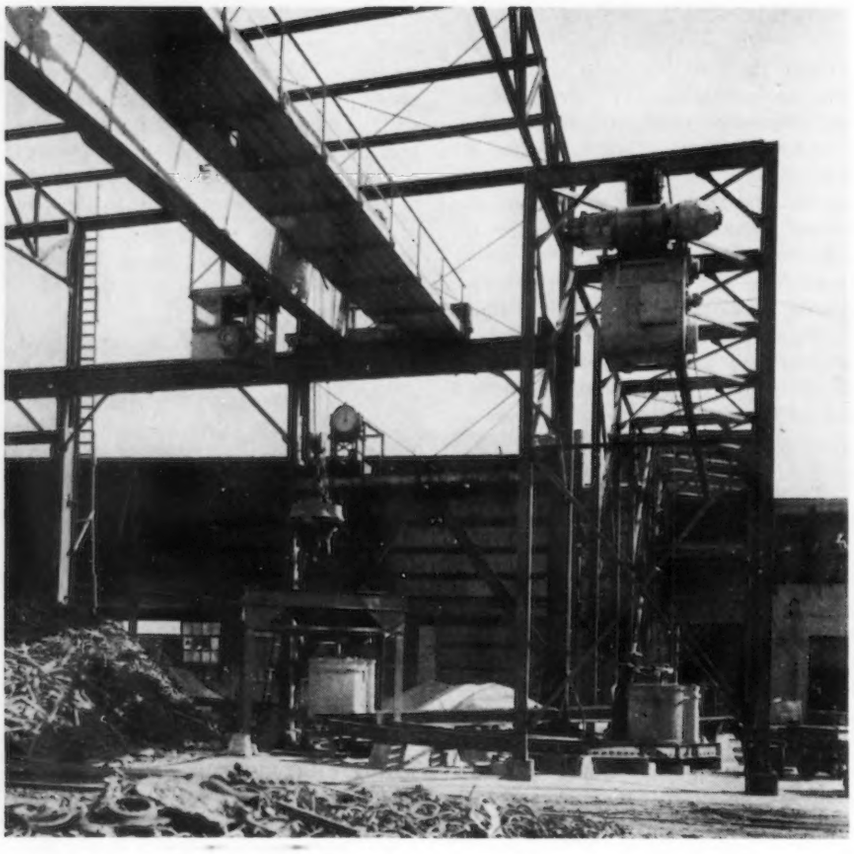


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FIG. 1—This photograph gives a comprehensive view of the manner in which the charging setup functions. The magnet is in position to deposit a load of pig iron into an empty bucket through the centralizing funnel. A loaded bucket at the end of the loaded conveyor is being attached to a cupola charger. Note the visibility of the scale dial.

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THE new mechanical cupola charging equipment recently installed by the Ferro Machine & Foundry Co., Cleveland, has enabled the company to obtain substantial reductions in the cost of charging raw material into the cupola. An interesting phase of this installation is the use of a yard crane to load and weigh the charges without an intermediate handling operation.

Previous to the installation of the new equipment, it was necessary to handle incoming raw materials several times; from the railroad car to the storage piles, from storage piles to elevator, etc. With the present setup most of the iron is loaded into the charging buckets directly from the railroad cars, thus eliminating the possibility of demurrage charges and one series of handling operations. Limestone and coke are dumped from the incoming hopper cars into underground bins below the elevator shaft where the cupola chargers pick them up.

Yard Equipment

As the accompanying photographs illustrate, the equipment for handling the iron supplies consists of a yard crane equipped with a magnet, a heavy duty scale with the dial mounted at the same height as the crane cab, an automatic turntable and a roller conveyor leading to and from the area served by the cupola charging cranes. The scale used in this installation is manufactured by the Atlas Car & Mfg. Co., Cleveland.

Scale Dial is Level with Crane Cab

The five-ton yard crane, a product of Shepard-Niles Crane & Hoist Co., Montour Falls, N. Y., has a span of 70 ft. The operator's cab is fixed to the cross beam, thus keeping the operator always adjacent to the load. When not loading charging buckets the crane can be used for unloading materials from freight cars to storage areas.

During the charging periods the buckets are deposited empty upon one section of a Mathews heavy duty gravity conveyor from whence they roll into position under the large steel funnel where the buckets are loaded and weighed. The funnel acts to centralize the magnet load when it is released and prevents material from falling outside the bucket. As the Atlas scale dial is mounted at a location where it will be clearly visible and relatively close to the operator's cab, the operator quickly acquires skill in handling the magnet which enables him to load the buckets with surprising accuracy while watching the scale.

Scale is Mounted on Turntable

The roller conveyor on the scale platform is mounted on an automatic

Equipment Lowers Charging Costs in Cleveland Foundry

turntable operated by compressed air. After the bucket has been loaded, the ground operator, whose function is to unhook empty buckets and hook loaded buckets to the charging crane, operates a valve, causing the turntable to move into line with the loaded bucket conveyor. Sumultaneously the conveyor is mechanically tilted so that the loaded bucket runs off the scale platform and down the loaded bucket section of the conveyor, finally coming to rest under the charging crane.

Ample storage space for loaded buckets is provided under the charging crane area. Brake stops along the conveyor also allow for bucket storage and permit only one bucket at a time to occupy the scale platform.

Two Shepard-Niles monorail cupola chargers, each with three tons' capacity and utilizing bottom dump type buckets, are used in this installation. Switches to each cupola enable one charger to be placing a load in the cupola stack while the other charging crane is picking up a load. The coke and limestone are charged separately.

The Atlas scale incorporated into this arrangement is the same heavy duty, all steel scale used on Atlas blast furnace cars. The scale's indicating dial can be equipped with electrically operated remote control recording devices in either the graph or type printing patterns.

At the Cleveland foundry's present rate of production, approximately 200 tons are handled across the scale in eight hours, but on occasion 240 tons have been handled in an eight-hour stretch.

In other foundries that have recently modernized the handling of raw materials, scale cars are combined with magnet loading in the iron yard. At the foundry of Caterpillar Tractor Co. the iron charging is by means of the yard crane with the magnet, while the stone and coke are weighed out on scale cars.

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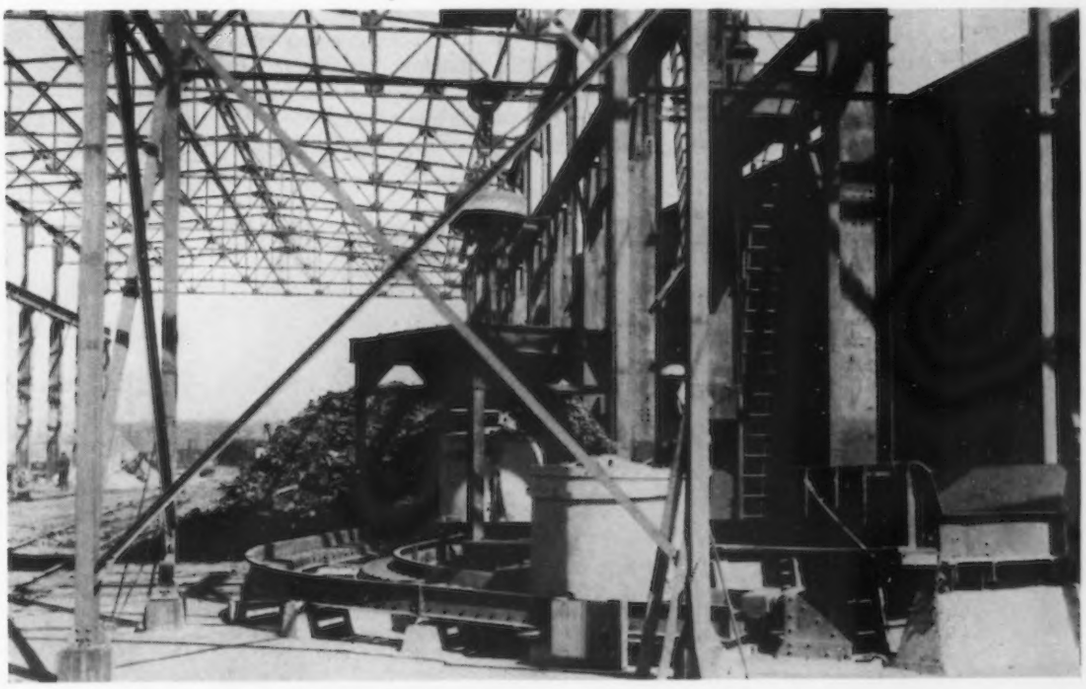

FIG. 2—This view of the charging equipment, taken from another angle, shows more clearly the details of the conveyor installation. In the foreground is a loaded bucket in position to be picked up by the charging crane, while in the background can be seen an empty bucket on the scale platform being loaded

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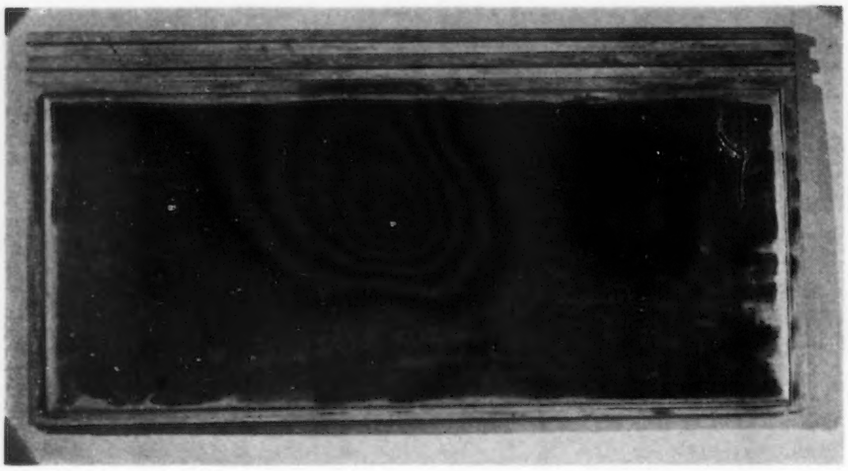

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THE raw zinc alloy die casting for the new Plymouth instrument board. This view shows the casting with front panel ground and edges trimmed. The next operation is a copper and nickel overall electroplated coating.

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Case History of the Finishing

ARTICLES have appeared from time to time in trade literature describing the general practice of finishing zinc alloy die castings. Specific data, however, have been rare, and for that reason the belief is that it would be interesting and instructive to present the exact details of the practice used on one particular part. For this purpose the glove compartment door on the '39 Plymouth automobile was selected. This is one of several die castings which add to the attractiveness of the instrument board arrangement of this car.

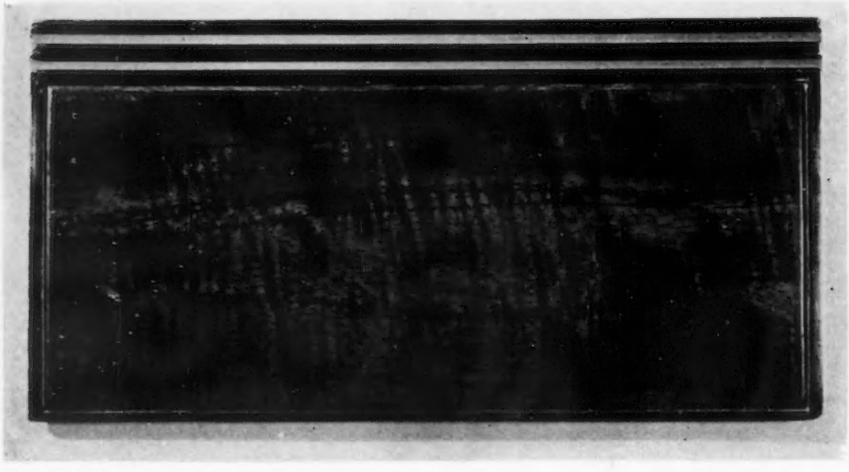
The door in question is a slightly curved plate finished with a grained organic film on the main panel and with red lacquer stripes and nickel plated relief. The sequence of operations involved is as follows: copper plate, nickel plate, spray ground coat, bake, apply wood grain finish, bake, spray clear lacquer over wood grain, force dry, polish lacquer, apply red lacquer, force dry, spray back, apply finely divided felt, bake.

The casting in this particular case was made by the Alemite Die Casting & Mfg. Co. of Woodstock, Ill., and the plating and organic finishing steps were carried out respectively by R. C. Mahoney and the Briggs Mfg. Co., both of Detroit. Dr. C. E. Heussner of the Chrysler Corporation very kindly cooperated in obtaining permission to use the information.

The castings are received at the Mahoney plant with the edges trimmed. The center panel, which ordinarily receives the grained finish normally is ground at the Alemite plant. At the Mahoney plant the castings are inspected and are then polished in the areas which are to appear in nickel relief. This is accomplished with 10 in. sheepskin wheels revolving at 1800 r.p.m. One hundred-fifty-mesh emery affixed with animal glue provides the abrasive surface.

A buffing operation follows the polishing. A padded buff consisting of alternate ¼-in. wide sections 14 in. in diameter and ⅛-in. wide sections 6 in. in diameter is used. The combination of this padding with the absence of stitching makes a very soft buff. The buffs are nominally 14 in. in diameter but are allowed to wear down to 10 in. before they are transferred to use in nickel coloring. The wheels revolve at 1800 r.p.m. and J. J. Stieffen's 100 per cent saponifiable Tripoli is used as an abrasive.

In the buffing operation the areas to appear in nickel relief are given particular attention. The main panel, however, is also buffed, although no attempt is made to eliminate completely the original grinding texture. The partial buffing seems to minimize plat-



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HERE the front of the casting is completed. A clear lacquer has been applied over the grain coat and red lacquer applied in the grooves

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THIS view shows the glove compartment door with a ground coat applied and baked on for best adherence. The following step is an application of a grained design to the panel.

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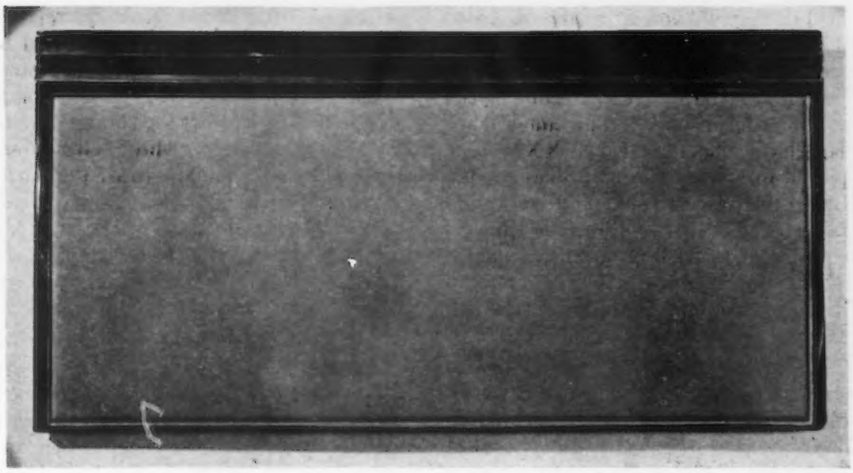

# of a Zinc Alloy Die Casting

ing difficulties in this area. The parts are then ready for plating.

The first step in the cleaning operation prior to plating is to scrub the parts in gasoline. This removes a considerable proportion of the buffing grease and insures that the recesses and crevices are free from packed compound. The parts are then racked and are cleaned electrolytically as cathodes for 8 sec. and then as anodes for 1 sec. in a 3-oz. per gal. solution of Wyandotte SM-6 cleaner operated at 180 to 190 deg. F. The cleaner tank is made of steel and acts as one electrode in the electrical circuit.

Following the cleaning, the work is rinsed in running cold water to remove adhering alkaline cleaner solution and is then dipped for 2 or 3 sec., or until definite gassing develops, in a room temperature 15-per cent hydrochloric acid solution, following which it is again rinsed to remove the adhering acid. The rinse tank used after the acid dip is separate from that used after cleaning.

The work is then ready for copper plating. R. C. Mahoney uses the copper-nickel system of plating and utilizes the Rochelle salt-copper cyanide bath. The metal content of the solution is held at 2 oz. per gal., the free cyanide at 0.6 oz. per gal., and the Rochelle salt at 8 oz. per gal. No carbonate is added to the new solution but the entire contents of the tank are discarded when the carbonate content builds up to 11 oz. per gal. in use. The bath is operated at a temperature of 160 to 170 deg. F. and at a *pH* of 11.5 to 12 as measured with *pH* papers.

The tank used in copper plating the glove compartment doors is of unlined steel of 740-gal. capacity. The work is agitated at the rate of 18 strokes per minute, each stroke covering a forward and return motion each of 3½ in. The anodes are copper balls held in steel cages and the nearest distance between the work and the anode is 4 in. to 6 in. The current density used is not measured but is sufficient to produce a 0.0003 in. minimum coating in 10 min. of plating.

Following the copper plating operation the parts are rinsed in cold water and are then dipped briefly in a cold 10 deg. Bé. sulphuric acid solution to neutralize any adhering cyanide solution, after which they are again rinsed in cold water and placed immediately in the nickel plating tank.

The nickel plating solution used is the Harshaw XXX bright nickel bath which contains essentially 45 oz. per gal. of nickel sulphate, 5 oz. per gal. of nickel chloride and 5 to 5.5 oz. per gal. of boric acid together with various brightening and wetting agents, the nature and amounts of which are plant secrets. The solution is operated

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THE back of the door as shown here is sprayed with adhesive and fan-flocked to resemble felt.

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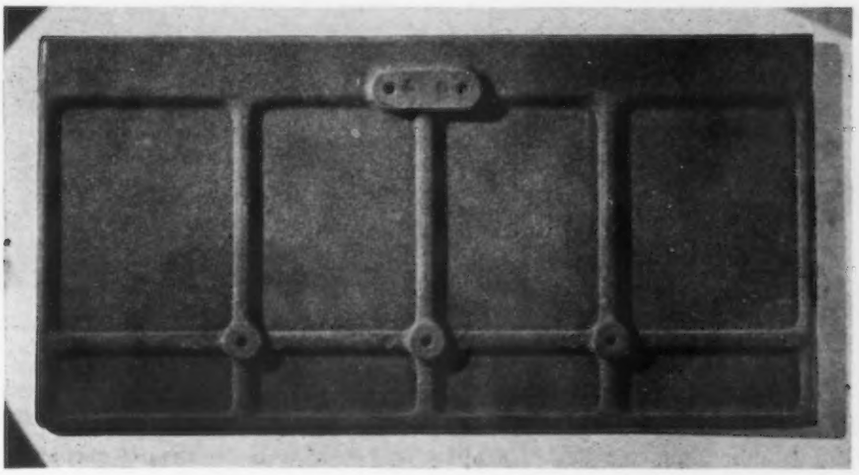


at 135 deg. F. and at a *pH* of 3.5 to 3.7. It is contained in a rubber lined steel tank of 740-gal. capacity equipped for agitation at the same speed as the copper tank. The anodes are Harshaw Chemical Co.'s XXX type placed to give a minimum distance between the nearest anode and work surfaces of 3.5 in. to 4 in. Plating is continued for 20 min. at a current density sufficient to give a minimum thickness of 0.0007 in. nickel at the thinnest point.

Following the nickel plating operation the parts are rinsed in cold water, then in hot water and are allowed to dry. The water stains produced in drying are removed by a light coloring operation using the 10-in. wheels discarded from the zinc buffing operation. The wheel speed is 1800 r.p.m. and the abrasive, used sparingly, is a mixture of lime white and rouge marketed for the purpose by J. J. Stieffen. The nickel as plated is of sufficiently good luster not to need coloring. The operation is required only because of the water stains.

The racks used in plating consist of a skeleton made of ¾x¼-in. rolled copper equipped with protruding contacts made of piano wire steel. One contact fits into one of the tapped holes in the rear of the door while another touches at a lower point. Four doors can be placed on one rack with the long direction vertical. The racks are protected with Michigan Chrome Co. black lacquer applied without gauze windings. The bottom of the work normally is about 4 in. above the bottom of the anodes in the tank.

The plated doors finally are inspected and shipped to the Briggs Mfg. Co. An interesting part of this particular finishing cycle lies in the fact that while only a few stripes of nickel show on the final finish, the entire casting surface is nickel plated.

At the Briggs plant the plated parts are inspected, following which they are washed in gasoline and the main panel face is lightly striated with emery cloth. Masking tape is then placed around the edges and over the areas subsequently to receive red lacquer. They are then placed on racks and carried on a conveyor through a spray booth where the center panel receives a single spray coat of Ault & Wiborg No. 776 (standard models) or No. 875 (deluxe models) ground coater. The conveyor then carries the racks through a 55-min. baking cycle at 260 to 265 deg. F.

As the work comes out the exit end of the baking oven the conveyor carries it to the graining room. The application of a wood grain pattern is accomplished by a transfer method in which the pattern etched on a steel drum is transferred in Ault & Wiborg No. 217 and No. 218 graining ink to a soft rubber roll whose circumference is exactly the length of the dashboard. The various die cast parts are placed loosely in place in the stamped dashboard and the roller applied to the assembly produces a continuous grain pattern over the whole.

Following another 55-min. baking treatment at 260 to 265 deg. F., the parts are masked again and are carried through a succession of spray booths in which they receive two applications of Ault & Wiborg clear lacquer 1301-1 with no interval of drying between coats. The lacquer is then force dried for about 40 min. at 120 to 130 ± 10 deg. F.

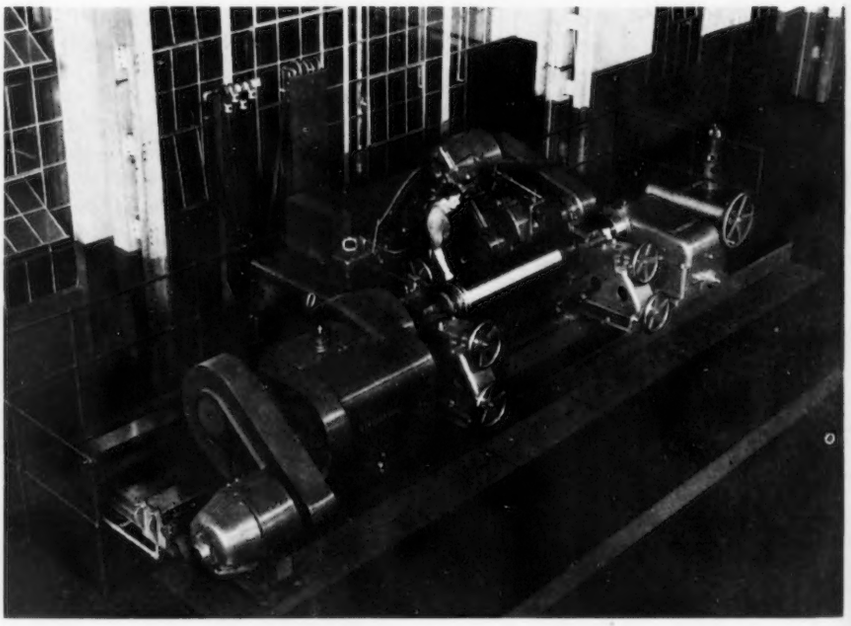
The lacquer used is only semi-lustrous when dry and high luster is obtained by hand rubbing with cloth covered wood blocks dipped in a paste of Snow Flake Products Co. SF-40 hand rubbing compound. Rough spots are smoothed with fine emery cloth dipped in gasoline before the hand rubbing operation is started.

Parts of the surface are then masked with tape. An operator protects the remainder of the surface with a hand mask and sprays the grooves along the upper edge with Ditzler XE-2165 Casino Red lacquer. The excess lacquer is wiped by hand from the exposed nickel surface and the finish is force dried for about 40 min. at 120 to 130 ± 10 deg. F. in the same oven used for the clear lacquer.

This completes the operations on the front face of the glove compartment door. Up to this time the rear face has received no treatment other than the nickel plating applied incidental to plating the front. The final operation involves the application of a fine felt material to simulate a cloth lining. This operation, which was described as fan flocking or sand flocking, consists first of spraying the backs with a final coat of Zapon-Brevolite QS22-B4782 Sand 169 base coat, following which a fine felt material identified as "mouse colored flock" is blown on. The flock material is marketed by the Atlas Powder Co.

In order to harden and dry the last finish the parts are baked for 15 min. at a maximum temperature of about 270 deg. F. in a vertical traveling tray furnace. The exit and entrance openings of this furnace are large in proportion to its height and it is doubtful that the parts are at maximum temperature for more than 5 or 6 min.

The glove compartment doors are now complete and are ready for their final inspection and installation in the instrument panel.



THIS Cincinnati 36 in. by 14 ft. roll grinding machine, with traveling wheel-head, is now on board ship headed for Port Kembla, Australia. It will be used for refinishing high-chromium, high-nickel and chill alloy iron rolls for hot mills, as well as steel finishing rolls in the new mill of the Commonwealth Rolling Mill Pty. Ltd., which will manufacture Armco steel sheets for auto bodies, deep drawing and stamping, and enameling. This shipment, weighing 140,780 lb., will be on the boat about 40 days. Port Kembla is approximately 60 miles south of Sydney, Australia.

Characteristics of Industrial Drive Pulleys

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By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

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CHAPTER 37 of a Series on the Economics of Industrial Power Transmission Methods and Equipment.

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A BELT drive is a partnership affair, in which the belt itself shares responsibility with the pulleys. It is commonly recognized that on the pulleys rests the function of stepping up or stepping down the speed of the driven shaft with respect to the speed of the driving shaft. But on the pulleys also rests the responsibility of preserving a coefficient of friction which will enable the belt to grip them and thus transmit the power initially; and likewise the responsibility of running true, and thus preserving the effective transmission qualities of the belt, at low maintenance costs.

Consequently the characteristics of a pulley which affect the economic transmission of power may be listed thus:

1—The *sizes* of the pulleys must be such as will properly transform the speed of the driving shaft to the speed required of the driven shaft.

2—The *shape* of the pulleys must be such that the belt will stay on them at any required speed of belt travel.

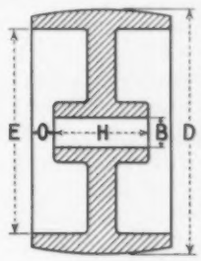
3—The *weight* of the pulleys must be such that the load imposed on the transmission system in operating them does not subtract too much power from the input energy.

4—The *coefficient of friction* of the pulley surfaces must be such that effective grip between the pulleys and the belt is preserved at all normal speeds and loads.

5—The *design* of the pulleys must be such that the centrifugal forces involved in high speed rotation do not cause them to disintegrate.

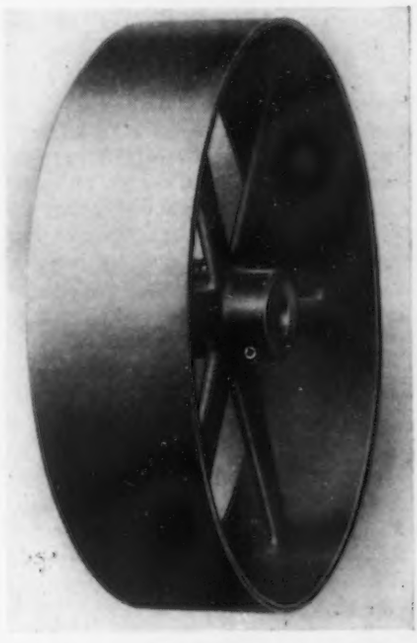
6—The *material* of which the pulleys are made must be such as to preserve a smooth contact surface (for rough surfaces cause belt wear); such as to combine strength with light weight (for excessive pulley weight increases the loads on the shaft bearings and the friction load of the drive); such as to resist overload and shock without damage; such as to conduct heat away from the operating surfaces (for power transmission generates heat); and such as to resist atmospheric effects (moisture, steam, fumes, gases, and excessive dust) where required.

Manifestly any one type of pulley (design, construction and material all being considered) will not equally meet all driving conditions. As a consequence it is found that in general five types of transmission pulleys are used for flat belt drives today, each differing in operating characteristics. These five general types are:



ABOVE

FIG. 1—Sketch showing pulley dimensions usually required in specifications.



AT RIGHT

FIG. 2—T. B. Wood's Sons Co. solid cast iron pulley, machine-molded.

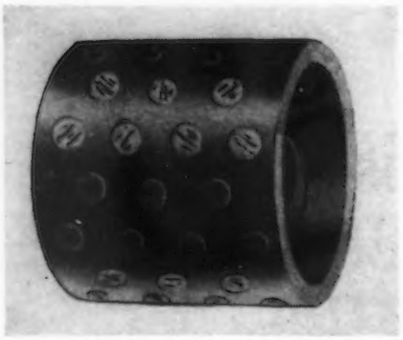


FIG. 3—T. B. Wood's Sons Co. solid cast iron pulley fitted with cork inserts.

A—The cast iron pulley.
B—The pressed steel pulley.
C—The solid wood pulley.
D—The metal spider, wood rim pulley, and
E—The paper pulley.

Whatever the type or construction of the pulley may be, there are two primary essentials of effective pulley service: 1—The pulley must be true in diameter, and 2—The bore or bushing must be truly at right angles to the direction of belt travel, and exactly central with respect to the pulley diameter. Either of these essentials being neglected, the pulley will not be balanced, but will run eccentric, causing excessive transmission loads and excessive drive wear.

First Principles

The most common material for pulleys is cast iron, a material ideal with respect to the cost of manufacturing, since it can be conveniently cast in any shape desired. Cast iron is, however, a heavy material, and except in such cases as engine flywheels where heavy weight is required, considerations of cheapness of product have all too frequently led to the reduction of cross-sections to such a point that shrinkage strains due to irregular cooling of the material are liable to greatly reduce the useful strength of the material. Careful design and correct handling in the foundry are required to overcome troubles of this kind, but since such care reduces the output, the extent to which its benefits are realized in the commercial product tends to become balanced by additional costs of manufacturing, and the original price economy is largely lost.

Split iron pulleys are less liable to shrinkage strains, and large sizes of cast pulleys are therefore always made with sectionalized hubs, to relieve the strains in the rims. Irregularities of molding may result in pulleys that are out of balance, due to the occurrence of greater thickness in some parts. Such pulleys are usually balanced by the addition of weights attached to the inside of the rim; and since these weights are necessarily attached at the lightest part of the rim and their centrifugal force concentrated at a point on the rim already weaker than normal, there is apt to be an element of weakness introduced which lowers considerably the theoretical flywheel bursting speed of the pulley. This is of little concern in low-speed operation, but of great importance where operating speeds may be high.

Many efforts have been made to increase the friction or tractive effort between the leather belt and the iron pulley by the use of pulleys covered with various materials having a more or less yielding or fibrous surface. Leather or cork inserts on the pulley face answer this purpose for a short

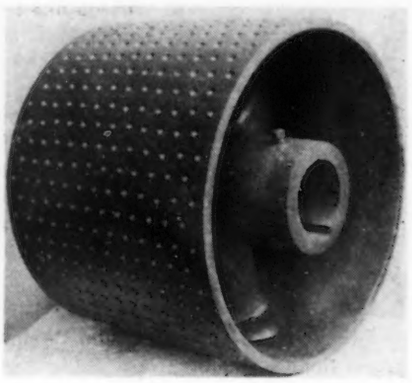


FIG. 4—Vacuum Cup Metal Pulley Co. solid pulley for use with 170 hp. motor.

time, but they are not durable and have to be frequently renewed. Another way of accomplishing the same purpose, which seems to be more satisfactory, is to indent the pulley surface with fair-sized hemispherical pits, so that a vacuum action is created between the belt and the pulley surface, as with the Vacuum Cup Metal Pulley Co. product.

Under certain conditions, such as extreme moisture, cast iron is the only suitable material for pulleys. On many shafts the extra weight in the rims is considered desirable, as the flywheel effect will steady the motor load. Cast iron pulleys will not distort under heavy belt pulls. To insure a true-running pulley the rims are turned and polished and the pulleys are balanced for all ordinary lineshaft speeds.

Lighter Weight

Efforts to overcome the great weight of cast iron pulleys led to the construction of pulleys made wholly or in part of pressed metal. Types range from the steel rim riveted to a central spider consisting of hub and spokes of cast iron, or steel rim with steel spokes cast into a central hub of iron, to the all-pressed steel construction. All these pulleys are usually split, the two halves being bolted together at hub and rim. Pressed steel pulleys may be termed "general purpose" equipment; they are relatively light in weight, easily stocked, easily installed, and are cheaper than cast iron pulleys in all the larger sizes. The steel construction is strong, yet not brittle, and there is practically no possibility of hidden defects such as might prove dangerous in other materials. In the older forms it sometimes happened that fastenings worked loose, but this seems to have been adequately corrected in modern construction. The rims, when very light, are apt to be deformed under the belt and centrifugal tensions due to heavy loads and high speeds; it is therefore important to make sure that the rims are heavy enough for the service in which the pulleys are to be used.

Wood pulleys of the solid type generally consist of a cast iron hub upon which is fastened a rim built up of segments of well-seasoned hardwood securely fastened together with glue and metal pins or wooden dowels. They are also frequently made in the split form, entirely of wood. The Sprucolite wooden motor pulley is made up of many laminations of wood, each lamination having the grain crossed with respect to the adjoining layers, and all glued together, then compressed under very heavy pressure to a fraction of the original bulk; after which the pulley is turned from the compressed block.

Wood pulleys are light in weight,

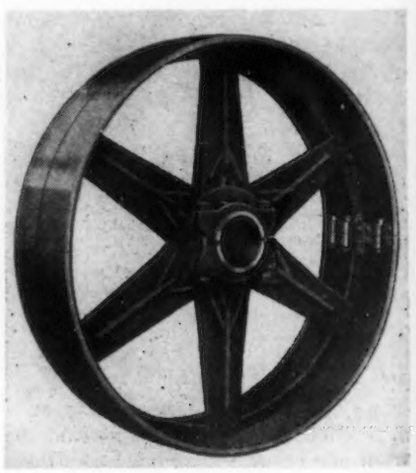


FIG. 5—American Pulley Co. steel split pulley of pressed metal construction.

they have a higher coefficient of friction than metals, and where shock loads occur, the natural resiliency of wood will absorb strains that would break up pulleys of other materials. Also, since the grip of wood on steel is greater than iron or steel on steel, there is less difficulty in keeping the pulley fastened to the shaft on other than keyed applications. Normally, wood pulleys should not be used where effective belt tensions exceed 65 lb. per inch of face, or where rim speeds exceed 5000 ft. per minute. But special designs of wood pulleys exceed these figures satisfactorily, and in tests a wood pulley has withstood rim speeds of in excess of five miles per minute.

The iron spider wood rim pulley was primarily designed for use on high speed textile mill drives. It will withstand speeds that would break up any other pulley, since the iron spider, having no rim, may be designed for high strength, and the segmental construction of the light wood rim may be designed to secure very high tensile strength without undue centrifugal effect.

Wood pulleys should not be used under conditions of excessive moisture. Extreme variations of atmospheric conditions may affect them unfavorably. In one respect they are inferior to the metal pulley; that is, the lack of uniformity of the contact surface. In some places around the rim the ends of the grain are perpendicular to the surface, while in other places the direction of the fibers is more or less tangential to the surface. The result may be an uneven wearing surface which, although imperceptible to ordinary observation, is bound to have an effect upon the life of the belt.

Paper pulleys are of two kinds; pulp, and sheet construction. In the making of pulp pulleys, straw paper scrap is reduced to pulp, which is put into molds, compressed, and dried under pressure. The boards thus formed, from a half to one inch in thickness, possess fibers not arranged in any uniform direction, and therefore have no grain. These boards are glued together under pressure to build up the required pulley thickness. As a consequence the contact surface of the pulley has its fibers running in every direction, many tangentially placed with respect to the surface of belt contact. Sheet construction uses thin sheets of straw fiber paper, made much like any other paper with definite grain, laid in piles with cementing material between and compressed under heavy pressure. The discs or rings forming the web and rim of the pulley are cut from these compressed piles, in which the sheets have been so placed that the grain of adjoining sheets run in different directions. As a consequence every point on the contact surface of the pulley has many fibers perpendicular to it, straight across the face, so that greater tractive effort is secured, not only when the pulley is new, but even when it has become well worn.

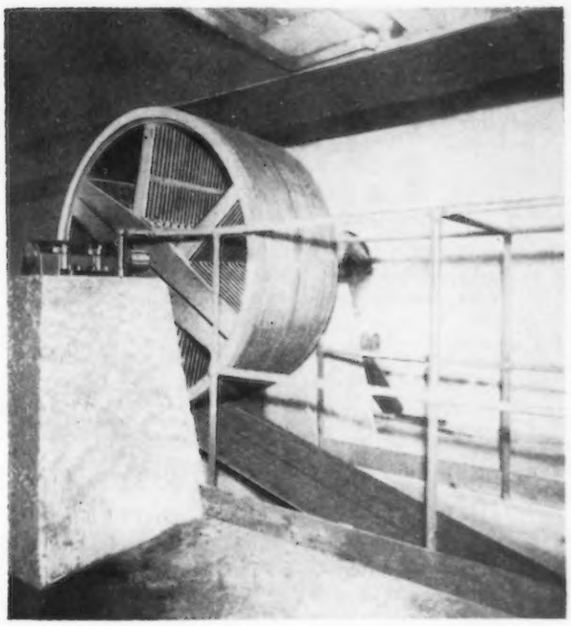
The rims of both pulp and sheet paper pulleys are, in general, strengthened by dowel pins extending through the rim and web; the web corresponding to the arms of a cast iron pulley. The webs are fastened to cast iron hubs by clamping them with bolts between flanges projecting from the hub. Paper pulleys require little or no balancing, and are therefore not subjected to the irregular centrifugal strains caused by balance weights. They are consequently relatively free from the danger of bursting at ordinary speeds.

Pulley Capacities

Cast iron pulleys are normally designed for rim speeds up to 3500 to 4000 ft. per min. Rim speeds of 4500 to 5500 ft. per min. are permissible and possible with specially designed and perfectly balanced cast iron pulleys. The cast iron pulley, says Staniar, can be employed for any practical power requirement. Its use is especially indicated where moisture conditions are encountered.

Pressed steel pulleys are normally designed for rim speeds up to 4000 to 5000 ft. per min. According to Staniar, pressed steel pulleys have been operated at rim speeds of 14,000 ft. per min. for 30-hr. periods without failure. Such speeds, however, are not practicable for industrial drives. The pressed steel pulley can be employed for all practical power requirements.

All-wood, or wood rim pulleys with



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AT LEFT

FIG. 6—Reeves Pulley Co. wood pulley on a heavy paper mill main drive.

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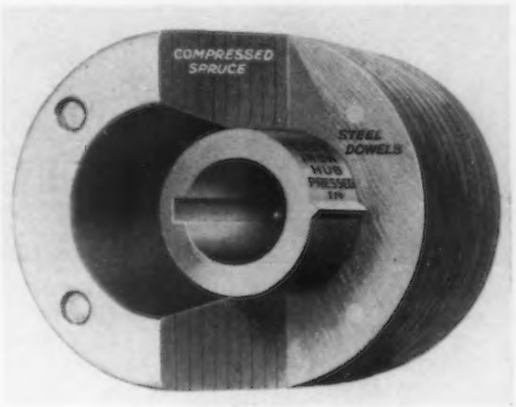
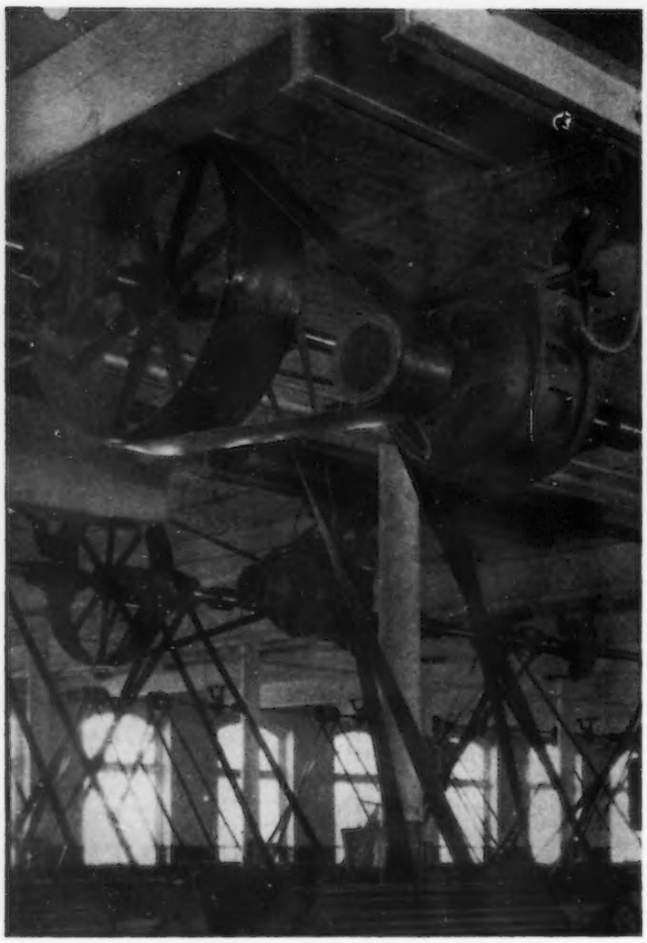


FIG. 7—Details of construction of American Pulley Co.'s Sprucolite motor pulley.



ABOVE

FIG. 9—Dodge Mfg. Corp. heavy duty steel split pulleys on lineshaft in a screw machine products plant.

o o o

AT LEFT

FIG. 8—Rockwood Mfg. Co. paper motor pulley driving card machine lineshaft in a textile mill.

cast iron hubs and arms can be run with safety at rim speeds of 5000 to 6000 ft. per min., and used for all practical power requirements, except where moisture conditions obtain. They have definite shock-absorbing characteristics, and therefore are especially useful on shock-load drives.

Paper pulleys are designed for accurate and high speeds, and may be safely used at rim speeds up to 8000 to 10,000 ft. per min. The rims do not crystallize or disintegrate, are tough and durable and will resist acid fumes or drip for long periods, and provide high belt adhesion. Paper pulleys are particularly adaptable for heavy shock loads.

Pulley Dimensions

Pulley specifications require four dimensions, expressed in inches, regardless of the material or type. These are generally given in the following order (see sketch of pulley dimensions):

Diameter. This is the distance *D* across the body of the pulley from rim to rim, through the center. Often an "exact" diameter is specified; for flat pulleys it is given from rim edge to rim edge, while for crowned pulleys, unless otherwise specified, it means the diameter at the top of the crown.

Face. This is the distance *F* across the contact surface of the pulley, parallel to the bore. It is generally given in accordance with the width of the belt to be used, unless an exact width of face is desired, in which case the word "exact" follows the face width dimension.

Bore. This is always given as the exact diameter of the shaft, as marked *B* on the sketch.

Crown. If the pulley is to be flat-faced, this dimension is not given, but the notation "flat-faced" should be made. If the pulley is to be crowned, however, the rise of the crown should be specified in inches per foot of face width. Unless otherwise specified crowns are ordinarily an average taper of about ⅛ in. per ft., with the line of joining of the two tapers in the middle of the pulley face well rounded off. Frequently this "rounding off" results in an almost oval curve across the face, from rim edge to rim edge.

At times it is important to have three other dimensions given. The distance from the end of the hub to the edge of the rim, *O*, may be desirable; as likewise the overall length of the hub, *H*, through the bore, and the allowable inside rim dimension, *E*. Where the pulley is keyed to the shaft, the depth of the key seat in the hub should be given.

Orders for Pulleys Should Contain Full Details

In any event, when ordering pulleys it is desirable to mention, in order to permit the pulley manufacturer to check the specifications, the width of the belt to be used, the type of machine on which the pulley is to be mounted as well as the name of the maker of the machine, and the approximate number of revolutions per minute at which the pulley is to be run. If the pulley is to be used as a motor pulley, it is well to give the type of motor, the horsepower, the operating speed under load, and if possible the frame number. With such data at hand, the pulley manufacturer may be able to suggest a better selection of pulley than would be normally specified.

Recent Design Innovations in Material Handling Apparatus

By FRANK J. OLIVER
Associate Editor, The Iron Age

A NUMBER of new types of fork trucks have been placed on the market, one a small gasoline powered type for loading freight cars to ceiling height if desired. Several accessories for battery trucks are illustrated. Developments in the field of overhead hoists and monorails have been many. Among hand propelled units are reviewed several designs of hand lift trucks. New types of stacking and storage bins are also included in this series.

MODEL K41 represents one of the latest developments in center control tilting fork trucks made by the *Yale & Towne Mfg. Co.*, Philadelphia. In such a truck, the operator is better protected from accidental injury and he stands closer to the load, permitting more accurate movement and greater maneuverability in operation. The particular size illustrated has a capacity of 5000 to 6000 lb., but trucks of this same type are available in a capacity range from 1500 to 20,000 lb. Main drive is by a double reduction bevel and spur gear in place of the usual worm drive. Forks are elevated by two roller chains driven by triple reduction spur gears, while the upright channel frame is tilted by heavy duty racks and pinions. Battery compartment is sufficient in size to contain a battery having as high as 24 kw.-hr. rating.

Yale & Towne has also developed a special center control truck for steel mill service that is a combination unit for elevating, tilting, upending and transporting heavy coil stock weighing up to 12,000 lb. Each truck is equipped with five adjustable 40-in. long forks, three on the bottom and two on the side for handling 54-in. diameter rolls. The trucks are articulated and have a 76-in. wheelbase.

Heavy Duty Electric Tractor Unit

DOUBLE reduction spiral bevel and spur gear drive axles assemblies are also used on a new heavy duty electric tractor of the four-wheel drive, four-wheel steer type, made by the *Mercury Mfg. Co.*, 4044 S. Halsted Street, Chicago. Axles are full floating, with the wheels mounted on tapered roller bearings and fitted with 20 x 6-in. solid rubber tires. Each wheel is driven by a series-wound vehicle type motor. Braking on all four wheels is effected by external contracting shoes bearing on drums mounted on intermediate gear shaft extensions. The tractor is built either for battery operation or gas-electric as illustrated.

Freight Car Loader

DESIGNED for loading and unloading freight cars and for stacking material in the warehouse as well, the gas-powered Carloader, made by *Clark Tructractor*, Battle Creek, Mich., is made in straight models of 2000, 3000 and 3500 lb. capacities, tiering to 60 in. and in three telescopic models that will tier in box cars with 10 and 12-ft. ceilings and to 108 in. in the warehouse. The lift mechanism is actuated hydraulically through an engine-driven pump. All models have hydraulic brakes also and self-starter. Front wheel drive and rear wheel steering give these units extreme maneuverability for getting into and out of box cars. Standard fingers are used for handling materials loaded on skids or pallets, but a hardened steel tapered lift plate attachment is available for getting under barrels, castings, heavy wooden boxes and the like.

Hoists and Motor Trolleys

AIR COOLING of the magnetic motor brake and of the Weston screw and disk type load brake and main gear assembly is an outstanding feature of the Yale Cable King wire rope electric hoist just put on the market by the *Yale & Towne Mfg. Co.*, Philadelphia. Fins simulating a Sirocco blower are cast inside the brake drum, and as the load is lowered this fan provides low pressure air circulation around the brake and gear housing and eventually out through vents in the bottom of the housing. The load brake is self-actuating and is fully enclosed in an oil bath between the reduction gears. The motor brake on the other hand is an external contracting type, solenoid operated.

The unit comes in capacities from ¼ to 6 tons and is powered with either a.c. or d.c. totally enclosed motors, with rotors mounted on permanently sealed ball bearings. Ball and roller bearings are also used throughout the drive train and drum mount. The drum itself is cast steel with machined grooves and is well protected by the main hoist frame, also of cast steel. Pendent cord or push button control may be had, with limit switches inside the controller box.

A NEW hoist that plugs into an ordinary light socket or three-phase power line is the Comet offered in capacities of 250, 500, 750 and 1000 lb. by the *Chisholm-Moore Hoist Corp.*, 116 Fremont Avenue, Tonawanda, N. Y. The construction

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BELOW

THIS Yale K41 center control tilting fork truck with a minimum overall height of 83 in. is capable of elevating the forks to maximum height of 102¾ in.

o o o

BELOW

THE new Mercury heavy-duty tractor of the four-wheel drive, four-wheel steer type, developing 3500 lb. drawbar pull and a light running speed of 7 m.p.h.

ABOVE

IN this Yale up-ending truck for coil stock the frame is split transversely and the halves joined by a large shaft about which the front and rear sections oscillate, tending to remove torsional strains and to provide the truck with a caterpillar type of motion at the same time keeping all four wheels on the ground.

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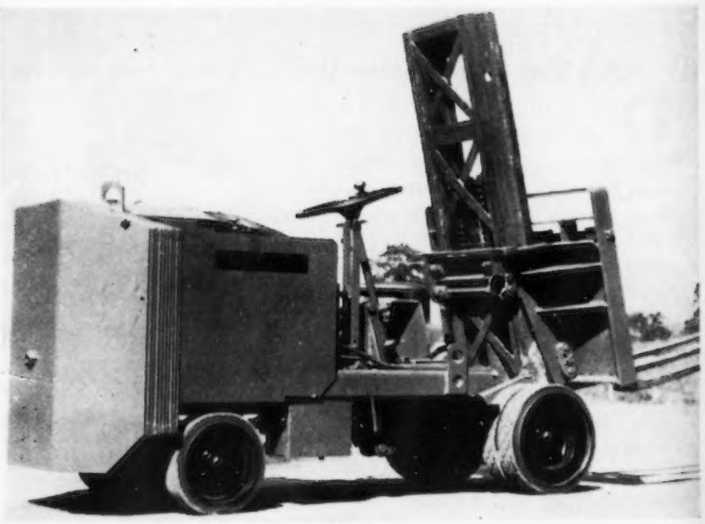

ABOVE

A NEW Towmotor fork truck has recently been built of extra heavy design and quadruple fork arrangements for handling bulky and unwieldy loads. It can also be had with a detachable scoop. Other features, such as straight gasoline power, hydraulic lift and tilt, high speed both forward and reverse, and driving wheels under the load are the same as on standard model lift trucks made by the Towmotor Co., 1231 East 152nd Street, Cleveland.

o o c

AT LEFT

THE Clark Carloader, with 6-in. inside turning radius and 67-in. outside turning radius, will turn around in a box car without backing. It has 38 in. wheelbase and 38 in. overall width. Gasoline powered, it travels 1 to 7 m.p.h.

ABOVE

TYPE LV Exide cell filler, made by the Electric Storage Battery Co., Philadelphia, consists of a semi-hard rubber nozzle with a set of signal contacts and a filler pipe molded in. Water is supplied through a hose connection and the rate of flow is controlled by a Lunkenheimer valve. The signaling device for registering the battery water up to level can be either a lamp or a buzzer mounted on the filler handle. It takes its current either from the battery being filled or from separate dry cells. Filler is made in lengths of 14 and 21 in.

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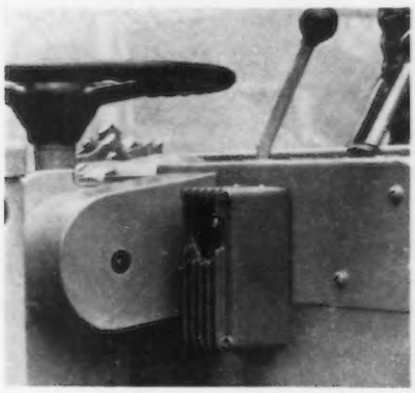
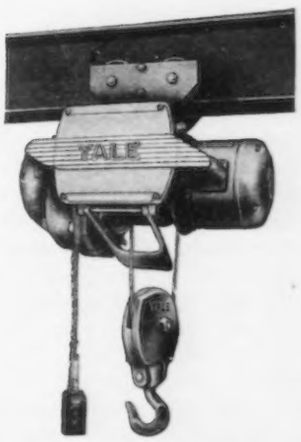
DRIVE through a pneumatic rubber tire is featured on the Louden MotoVeyor, a motive power unit for overhead conveying equipment. Traction is sufficient to allow the unit to travel up or down inclines.

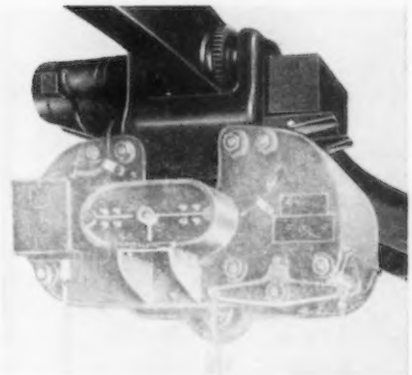


IN the new Exide battery discharge indicator for industrial trucks, the warning signal is in the form of a red light contained in the sturdy case shown. As the time for recharging approaches, there are momentary flashes of light when the truck is started up, and when the battery is nearly exhausted of charge, the light remains on all the time. The accuracy of this discharge indicator is said to have been developed to a high point.

THE 500-lb. capacity Chisholm-Moore Comet portable hoist weighs only 85 lb. and plugs into an ordinary lamp socket. Made in capacities up to 1000 lb.



THE new Yale Cable King wire rope electric hoist has internal fan blades cast on the motor brake drum for cooling this brake and the gear housing containing the submerged load lowering brake. The plain trolley type is shown.



THE type RB four-wheel drive motor trolley makes it possible to convert any class B Lo-Hed hoist from hand to power propulsion on the monorail.

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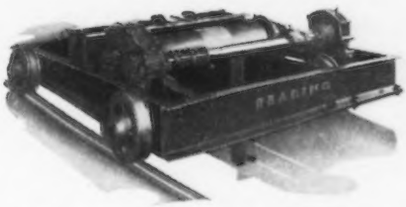
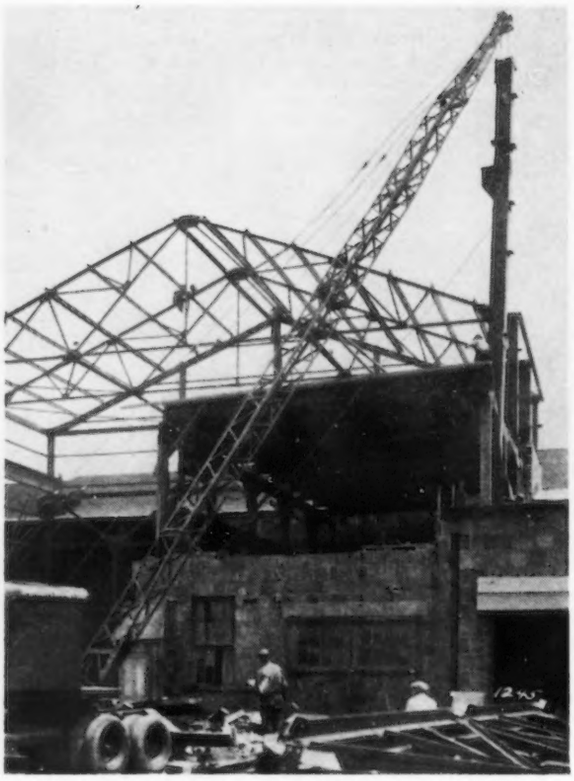


NEW style Reading crane trolley, shown in the 5-ton size, is especially adapted for heavy handling operations where floor space and headroom are limited.

ABOVE

J. B. ENGINEERING SALES CO., New Haven, Conn., has developed a new form of Mansaver grab capable of lifting 12-ton strip steel coils. This grab, which can be hung from any crane, is designed so that the two swinging arms first are cammed outward, by the coil itself, then fall back into place for lifting. A limiting device on the travel of the legs permits the load to be released by moving the grab first to the left and then slightly forward and to the right, leaving the coil behind.



AT LEFT

HEAVY duty 13-ton capacity (at 10 ft. radius) motor truck mounted crane equipped with a 75-ft. boom. A product of the Universal Crane division of the Thew Shovel Co., Lorain, Ohio, this unit has been especially designed for the steel erector and bridge builder. The all-welded steel boom comes in a basic length of 25 ft., but center sections are available to extend the boom up to 80 ft., or longer with tip extensions.. Each splice is formed by four clevis and pin connections, making for ease in assembly. Boom lacing is a continuous bent angle running the length of each section. Boom derricking and lowering are both power controlled through a wide range of speeds.

is said to be compact and rugged, yet light in weight. Precision ball bearings are used throughout, and the gears are machined of heat-treated alloy steel. The one-handpull controller with delayed reversing feature, allows inching of loads, and a quick acting brake is provided. Hook is suspended from Herc-alloy Double-Duty chain. Motor is a heavy duty high-torque type.

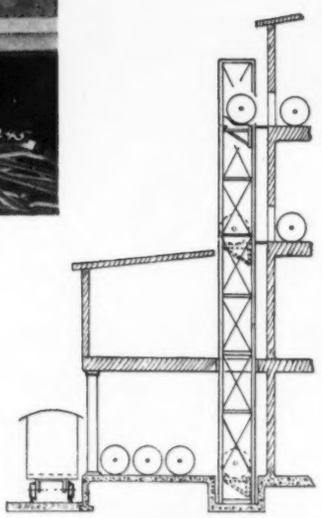
A MACHINE for automatically transporting loads over an overhead track system, including inclines, is the MotoVeyor recently introduced by the *Louden Machinery Co.*, Fairfield, Iowa. Principal design feature is a rubber tired drive wheel with drive shaft supported in precision ball bearings on each side. Main frame is cast in one piece and under it the motor is mounted. The range of speed possible is 60 to 600 ft. per min., and it maintains uniform speed going down grade. This unit may be built into a cab or step-on platform so the operator can accompany the load.

A MOTOR driven trolley either sold separately for converting any class B Lo-Hed hoist of the bolt suspension, plain trolley or hand geared type of 1 to 3-ton capacity into a power trolley unit, or sold in combination with such units, is offered by the *American Engineering Co.*, Philadelphia. Features of the RB motor trolley, as it is called, are its moderate price, short wheelbase, low headroom, four-wheel drive and balance. Curves with a minimum radius of 7 ft. can be negotiated. All trolley wheels and gear shaft bearings are mounted on Hyatt bearings. The motor is a ball bearing, fully enclosed type, operated by a drum type controller through pendant cords.

IN order to provide more headroom below the girder bridge beams on which it rides, the hoisting mechanism is built right into the trolley of a new type of overhead electric traveling crane made by the *Reading Chain & Block Corp.*, Reading, Pa. Hoisting hook goes up between the bridge beams, permitting maximum high hook travel. Other features stated by the maker are positive fast and slow hoisting speeds regardless of weight of the load, protection from oil leakage, anti-friction bearings, and accessible crane bridge drive. These traveling cranes are built to plant specifications.

New Crane Controller

Hyper-synchronous lowering speeds for cranes with a.c. motors, permitting an increase in crane handling ability, is one important application of the frequency relay magnetic control recently announced by *Electric Controller & Mfg. Co.*, Cleveland. This system of control uses relays which operate from the frequency induced in the rotor circuit and hence automatically regulates acceleration to allow the motor to exert predetermined torque requirements throughout the entire starting period when hoisting. In the lowering direction, the new control provides various degrees of counter torque to regulate the lowering of an overhauling load, in place of a mechanical load brake. The counter torque lowering points are of a reduced value (compared to hoisting torque points) so as to permit close control in inching operations.



BY opening an electrically interlocked door at the desired floor level and with the aid of a selective system of relays, the cradle on this special roll conveyor will discharge its burden as desired going either up or down. The empty cradle returns to the original floor level automatically. Although originally designed for handling paper rolls, the same system can be applied to other roll products or barrels. This equipment is made by the Revolvator Co., North Bergen, N. J.

In the past, a.c. hoists have been limited to approximately synchronous speed in the lowering directions, but with the frequency relay magnetic control, the last point on the master switch permits lowering overhauling loads about 50 per cent faster when operating with about 50 per cent load on the hook. With a magnet or other crane having fixed load value, the control can be designed to provide 150 per cent (hyper-synchronous) speed with this percentage of load. Control points in the hoisting direction, on the other hand, provide speed and torque regulation comparable to standard hoist controllers.

Hand Propelled Equipment

A HAND propelled telescopic stacker with retractable revolving base has been developed by *Lewis-Shepard Sales Corp.*, 425 Walnut Street, Watertown, Mass. The elevator may be moved along the floor to any position, the regular travel wheels retracted and the whole unit revolved on a circular base so as to give maximum maneuverability. The stacker mechanism is power driven through a worm gear and will elevate a load of 1500 lb. on the platform to a height of 133 in. or lower it to within 8½ in. from the floor. Safety devices include a thermal overload switch and a solenoid operated carriage brake.

IN the new Weld-Bilt hydraulic lift truck, made by the *West Bend Equipment Corp.*, West Bend, Wis., the hydraulic unit is placed in a horizontal position within the frame of the truck, protected from lateral and vertical shocks. Standard lift is 3 in. and is secured by a minimum movement of the ram. Lift can be effected with the handle in any position in a complete circle. The lowering pedal is located on the head of the truck and speed of lowering is definitely controlled by foot pressure. This lift truck has an all-welded steel frame and head. Front wheels are widely spaced for stability and all wheels are equipped with anti-friction bearings.

WELDED steel construction is also used in the *Lewis-Shepard* hydraulic Footlift truck, made in capacities up to 8000 lb. As the name indicates, hydraulic lifting is accomplished by a foot pedal, using a standard hydraulic power unit. The "Dead-Man" release control gives variable lowering speeds and is said to give shockless lowering. The load may be

(CONTINUED ON PAGE 108)

o o o

AT RIGHT

THIS special Yale lift truck was designed for transporting acid carboys. The truck has a 6-in. mechanical lift and the wing attachments on top of the lifting frame permit adjustment to take care of variations in carboy width. Lowering is effected through the aid of automotive release checks installed in each lower side frame. Hyatt bearings are used on the wheels.

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AT RIGHT

THE Weld-Bilt hydraulic lift truck is furnished in standard capacities of 2500, 3500, 5000 and 6000 lb. The hydraulic unit is well protected from shock.

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AT LEFT

THE travel wheels of this Lewis-Shepard stacker may be retracted, allowing the entire unit to revolve on a circular plate. Platform measures 48 in. long by 42 in. wide and can elevate a 1500-lb. load to height of 133 in.

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More About Industry's Opinion of

From a Precision Tool And Instrument Co.

IT would seem to us that we are very likely to have less experimentation by the Government and perhaps a better realization of the fundamental principles of business. Speaking from our own observations, executives in business seem to feel as though the Republican gains in the House and Senate would put a curb on any additional laws to restrain business, and confidence and sentiment seem to be very much improved.

From the Secretary of a Cutting Tool Co.

THE recent election has created a much better feeling among the people we contact. We are also experiencing a slightly better demand for our products.

However, buyers seem to be cautious until they are sure as to what influence the President will have in carrying forward his press statements that the new deal program will be continued.

From the President Of a Rivet Mfg. Co.

NATURALLY, we are pleased with the showing we made here in Ohio. I, personally, feel the results will mark the beginning of a change in business for the better. It has been said that our American system of two-party form of Government is the best for all concerned. When one party remains too long in power it becomes obnoxious, and then it is the prerogative of the voters to change conditions when the necessity arises. Evidently, the voters felt a change was necessary, and, no doubt, that is why the Republicans assumed prominence in the recent elections in Ohio.

*A similar survey of opinion was published in THE IRON AGE of November 24.

From the President Of a Concern Making Excavating Equipment

THE results of the recent State elections are naturally pleasing to most business men because they feel that it shows a trend towards conservatism which should translate itself into cooperation between Government and business and lead to less regulation of business activities.

I share the view expressed above. The better feeling, however, has not yet resulted in any increase in business activity in excavating machinery such as we manufacture, but we have noted that there have been more active inquiries in the past few weeks than we have received for many months.

I feel that many business men who have been deferring plant extensions and replacements of old and obsolete machinery will continue to defer large commitments until the new Congress meets and the results of the election have been translated into definite action favoring business.

From the President of a Clutch and Coupling Co.

I AM glad to answer your letter soliciting an expression on the probable effect of the recent elections on business. In my own case there seem to be three bases on which to form an opinion:

1. My own personal opinion is that the effect will be distinctly favorable.

2. Every man with whom I have talked about this since November 8 has expressed the same belief.

3. As our company has 35 representatives well distributed throughout the country, their observations taken together are worth much more than mine. I am, therefore, sending to each of them today a letter, of which a copy is attached, to be checked and returned immediately.

On November 30 I will forward to you the results of replies received to that date.*

*This will be published when received. Editor.

From a Prominent Machine Tool Dealer

IN reply to yours of the 17th, requesting my opinion regarding the effect of the recent election on business conditions — the results of the election have without any doubt created a decidedly improved attitude on the part of the manufacturers contacted by our sales organization. This change, however, has not manifested itself to any great degree in new orders being placed, but there has been a very decided interest in the way of increased quotations, which is due primarily to the change in the mental attitude reflected by the spirit of optimism which has not previously prevailed for some time.

With the prevailing trend, we are looking forward to a very decided increase in actual orders beginning with the New Year.

From an Automobile Maker

IN this Democracy of ours, opposition is a good tonic for the party in power. I most certainly hope that the trend will be toward better understanding between labor leaders and industrial leaders, and that each will be legally required to be responsible for his own acts. Such a result should greatly increase the confidence of the buying public, a large percentage of whom are the rank and file of industrial employees who are pleased to have a steady job at a fair wage with a fair assurance of job security.

From the President of a Silverware Mfg. Co.

ALL the people with whom I have talked are pleased with the results of the recent state election. We believe here that the conservative trend shown by these elections will increase enterprise and promote better business. We are quite strongly of the opinion that it will improve our business, and we are looking forward to an improvement in business well into the future.

the Election Effects on Business*

From the President Of a Chain Mfg. Co.

TO my mind the election of governors who are pledged to enforce the law as the courts interpret it no matter from what quarter it is violated, and the rebuke on a national scale to candidates who had sanctioned waste, inefficiency, unfairness and high-handedness on the part of Government, as evidenced in both national and state returns, pressages a halt to business baiting and the return of a period in which the business man will have an opportunity not only to present his case and have it heard fairly, but also to plan for the future in a comparatively stable domestic situation. Barring unfavorable foreign developments this should give the business man enough confidence in the future to encourage him to appraise and undertake risks; and when that is being done, our sick and harrassed economy may be on the road to getting well enough eventually to pay off rather than collapse under its load of debt.

From the President of a Forging Equipment Concern

I AM very much pleased with the results of the recent state elections and am optimistic about the business situation for the years 1939 and 1940. We probably cannot hope for much improvement this year because in such states as Michigan and perhaps some others, C.I.O. labor is planning all the trouble possible for employers during the present Governor's term of office, with the evident intention of driving employers into signing agreements while they have the support of the present state officials. That will, naturally, prevent any business improvement, and, on the contrary, may further stagnate it for the next two months, but on the whole, I feel we can go into the new year with a very definite prospect of a larger volume of business and a more satisfactory situation.

From the President Of a Transmission Equipment Co.

TO those of us who desire to keep our Ship of State on an even keel, the results of the recent election were gratifying and encouraging, and indicated a trend in the right direction. While some industries seem to be better off than they were some months ago, the great majority still need work to keep busy the enormous production capacity available throughout the country.

Because the sounding rod indicated we were getting close to shallow water, the people, through the election, have hinted to the Captain of the Ship of State, that it's time to rechart his course and again get into open water. If this is done, and safety is again assured, I feel investor confidence will return and with it uniformly better business conditions.

From the President Of a Machine Tool Co.

NATURALLY the results of the election are encouraging, chiefly because the trend seems to be toward strengthening the minority party. So far we have not been able to note any great amount of encouragement. However. I think the business public in general is waiting to see how the reigning administration takes a general trend back to sanity. Business must have some general encouragement insofar as Government meddling is concerned before idle sums can be invested.

I believe the prospects for 1939 depend in a large measure upon the action of the reconvening Congress.

From the President Of a Steel Barrel Co.

WE were all pleased with the returns of the recent election. We believe the results will reflect an improvement in business generally as we have already noted a feeling of greater confidence in our own industry.

From the President Of a Large Tractor Co.

ONE effect that I can feel on myself is that it is a little easier for me to approve expenditures for factory equipment and a little easier for me to sanction forward commitments for inventory.

Business men have been hoping and, until recently apparently, looking in vain for an indication from the public that business was to have a square deal. I believe that we have had that indication and that progressively we will feel more and more like depending upon it with the result that business should expand.

From the President Of a Sewing Machine Co.

POLITICIANS are all alike, and it certainly is altogether too soon to rise and comment on what effect the recent State elections will have on business.

If my memory serves me correctly, it seems to me that the Republican candidates promised just as much, and possibly more, in the way of old age pensions and, I presume, jobs as their opponents. As long as there is money to spend, any of them will spend it; and once a tax is established it seems to remain undisturbed forever.

From the President Of a Cutlery Co.

I FEEL that the result of these elections must have proven to a great many people, as it did to me, that certainly all of the people in the United States have not turned "Red" and it is very encouraging from a business standpoint to see so many State governorships won by the Republican Party, and certainly the result in the State of Michigan should prove to the people in general that the labor conditions such as were arranged in Michigan by the C.I.O. are not wanted by the people of that state.

From the President of a Structural Steel Co.

WE believe the election makes unlikely further radical New Deal legislation and probably the modification of some of the worst of the present radical laws. Therefore we expect capital to now seek normal investment opportunities and that much postponed construction will get under way shortly. We are confident 1939 will be a much better year for the capital goods industry than 1938 has been.

From the President Of a Metallurgical Co.

I FEEL that the elections should add much confidence to business generally and tend to promote better business. I think this is especially true in the State of Michigan where the bulk of the automotive industry is located and with confidence promoted in this industry it should spread pretty much throughout the country. After all, the elections mean there is a growing feeling against too much reform and lack of law enforcement and a trend toward rationalization of Government to help business rather than to retard business.

From the President Of a Drill Mfg. Concern

I FEEL very much encouraged at the results of the recent elections. I do think, though, that we must remember that "one swallow does not make a summer" and that education of the people still has a long way to go before the present unsound policies will be discarded and sound ones put in their places.

The thing that particularly struck me in the election was the apparent repudiation of John Lewis and the C.I.O. Wherever his organization was a factor, it appears to have been defeated, as in Pennsylvania, Michigan and Ohio. I feel that he and his organization are definitely a liability politically.

From the President of a Marine Hardware Co.

NATURALLY we are very much pleased with the results of recent elections, which did a great deal to build up our confidence. We cannot help but feel it will have a stabilizing effect on both legislative bodies, and the opinions of business executives throughout the country will be treated with somewhat more respect than in the past. We are optimistic as to the future to the extent that we are going ahead with the largest construction project we have ever undertaken.

From the President Of a Shipbuilding Co.

TO me, the greatest encouragement from the election, lies in the evidence that a large number of our people have come to the conclusion that the New Deal is not successful, and that the country as a whole has made a definite turn away from the foolish policies of the past five years. I believe we can look forward to 1940 with more confidence and some real hope that a brighter future is in store for the country.

From the President Of a Cutting Tool Co.

THE venture spirit in America at present is in the doldrums. It must be revived. Government spending cannot possibly replace it. At the moment I see no definite signs of its being revived in the very near future. We are headed, therefore, toward an interim recovery based on Government spending, but not for a long time upward movement based on long time confidence that invariably followed depressions prior to 1930.

From the President of a Hardware Mfg. Co.

I CONTINUE to like the statement that We Cannot Be Legislated Into Success and, therefore, I never expect any great help via elections.

Our Government being virtually a two-party affair; and the one party having been in the saddle for its second experiment — an increasingly greater number of voters had begun hoping, searching and working for a change.

The recent more or less condemnation vote will, in my opinion, therefore please many—and that state of mind always helps build better business conditions.

From the President of a Large Automobile Co.

PERHAPS it is too soon to make any worth while predictions, but I am inclined to agree with you that the elections were a constructive business factor. The effect should be to increase investor confidence and to promote better business, as you have indicated.

From the President Of a Metal Stamping & Pressing Co.

I AM glad to express my marked personal optimism in regard to better business since the recent elections, which indicated that the people are returning to an indorsement of the enterprise principle of American business, which has yielded the highest standard of living the world has known—a recognition and appreciation of industry rather than persecution fostered by the political "brain trust boys" for some time.

Of course we must look to later developments and a return of confidence to substantiate the suggestion that business only and not Government can provide sufficient employment for the inhabitants of this nation.

From the President of a Forging Equipment Co.

IF the last election can be properly interpreted as a result of a more realistic consideration of the country's problems by a mass of voters, it lends encouragement to the idea that thrift is again considered a virtue.

Thrift is necessary in the case of both individuals and corporations, to provide funds for careful investment in profitable enterprise to meet the tremendous latent demands on our country.

At the same time, it will be necessary for everyone to contribute their share of taxes, and the results of the election promote hopes that careful administration and the elimination of punitive efforts may be realized in meeting the problems that confront all of us.

From the President Of a Compressed Air Equipment Co.

TO industry as a whole the recent election was encouraging, with the result that the immediate future is looked upon with optimism. This will lead to further business improvement.

Practices, methods and promises of high Government officials are no longer acceptable to the public, who want assurances that are not meaningless. Also, the continual high taxes and lavish spending are objectionable. The people want sound economics to prevail and freedom from political harassing of industry.

From the President Of a Heating & Air Conditioning Co.

THE recent elections have removed in great part the fear that has been growing stronger in the minds of a great many business people in every station in life. One of the fundamental principles of this country has always been that we should be governed by two major parties. It has always been the prerogative of the minority to criticize, sometimes constructively and sometimes destructively, the party in power. The effect on many business people up until November 8, 1938, was that the one political party was becoming so strong that there was little or no use or sufficient strength for the minority party to seriously and effectively combat the major party. Since November 8 the people of this country have realized that there is strength still, and growing strength, in the old G.O.P. and that we are again reverting to the two-party government.

The results of the election have also served to nullify rumors of high pressure here, there and the other place, and the tendency to believe that every policy in this country has been dictated by a few in power.

The raising of the morale alone has already tended to instill new fight, new courage and new efforts to pull this country out of the depression and put it back on its feet where it should be.

From the Vice-President Of a Refractories Co.

THE results of the elections are most gratifying in the way they slapped at maladministration, wasteful spending and dishonesty. They confirmed the feeling I have had for some time, that the trend of the general public is generally back to a higher level of conservative thought, logic and honest endeavor.

From the President Of a Power Transmission Concern

WHILE I am of the opinion that the result of this election has materially increased and strengthened confidence, I am also of the opinion that the ground work for a steady and healthy improvement in business has been laid, but that the principal stumbling block in the path of this progress is the Civil War that now exists between the two principal camps of organized labor, and that unless immediate steps are taken by the workingman, industry and the Federal Government to bring about a reconciliation of organized labor, we will see additional withdrawal from these groups similar to the recent action of the Ladies Garment Union, that will only tend to complicate this condition.

From the Vice-President Of a Pump & Hydraulic Equipment Co.

AFTER five years of experimental efforts along a course designed to provide more employment and a sharing of the blessings of our national resources and economy, the majority of our electorate are becoming more conservative, because:

The unemployment problem is still as acute as ever and Government "pump-priming" is not a cure but a palliative only.

The National Debt is becoming so large that a change to a balanced budget is imperative.

Private capital will not take its place in providing work and income as long as business is persecuted by the Government with no assurance of a suitable return or freedom from oppressive taxation.

Legislation and administration of laws favorable to large minority groups of our people, to the prejudice of employers or the citizen at large, do not promote the public welfare of our country as a whole.

Public money used to provide jobs and sustenance of people needing relief should be spent only where really needed, without reference to political affiliation.

Working people of all classes are gradually beginning to realize that the lavish expenditures of our Government are really not merely money which banks put up for Government Bonds, but is money which has been saved through thrift and deposited in the banks by millions of people who receive ever lower interest rates and with the possibility that if the practice continues there is danger of total loss through inflation or a collapse of the public credit.

Values are only created by useful work, and increasing of wages or reduction of hours is bound to be reflected in higher costs, unless there are technological improvements to offset the difference. The worker feels the effects of this mistaken policy later by a higher cost of living and through the reduction in purchasing power, which causes orders to fall off and less goods are needed and hence less jobs are available.

From the President Of a Large Forging Co.

WE think that the effect will be beneficial because it seems clear that the people are no longer willing to give the Administration a blank check and are no longer willing to sponsor additional reforms at the expense of early recovery.

Not only are these interpretations bound to affect the temper of the forthcoming Congress, but they also give hope to those who strongly desire a change in administration in 1940—and that group naturally includes most of those who hold the purse strings of industrial expansion.

Naturally, capital will "strike" before it will cooperate with any economy that denies capital equal consideration in the public interest with the rights of labor and consumer. The election, therefore, affords hope that the equal partnership of capital, labor, and consumer is just as important to the nation's economic welfare as the equal and coordinate partnership of Congress and the Supreme Court with the Executive is to the nation's political well being.

From a Builder of Sheet Metal Forming Equipment

WE feel that the trend which was indicated in the State elections for a change in parties was definite expression of the people against many of the policies of the present administration, and that it will have a tendency to help business due to the fact that there will be enough conservative members in both the House and Senate to offset any radical legislation that might be proposed. However, we do not believe there has been, as yet, enough expression of this kind, but we feel sure the trend is such that this will be definitely seen at the next presidential election.

From the President Of a Sheet Steel Co.

WHAT has been needed for a long time is confidence in the long range view for business and the fact that the conservative element is now in a position to be heard should make the passing of radical measures much more difficult. If business is given a fair break and has some assurance that it is not to be continually put on the defensive, it should make all the difference in the world about future expansion plans and I think we will see this view carried out in the coming year. I certainly hope so.

THIS WEEK ON THE ASSEMBLY LINE

° ° °

By W. F. SHERMAN
Detroit Editor

° ° °

. . . Daily auto output increased, promising 100,000-car week . . . Heavy steel buying expected as quarter comes to close . . . Muffler corrosion creates problem for engineers and suppliers . . . Robert Graham predicts record export year.

DETROIT,—The current week's output of new automobiles is likely to pass the 100,000 mark for the first time in any week this year. Thus, the automobile industry enters December with plans for further increased output to keep pace with a steady high rate of retail sales. The month also should be marked by increasing activity on the part of steel buyers.

With sales on the increase, auto plants have somewhat of a delivery problem. Ward's Automotive Reports declared last week that the advance in daily production rates was necessitated by the sizable order banks at the factories and the continuing volume of retail orders. Ward's estimated last week's output (four days, because of the Thanksgiving holiday) at 84,930 units, which compares with 96,735 the previous week and 58,955 produced in Thanksgiving week last year.

The holiday curtailed Ford production to 13,500, a loss of 2000 from the previous week. Chevrolet did not lose one day last week despite the holiday and maintained production at 25,000 for the week, only 1000 less than the previous week. Ford figures indicate increased daily output while Plymouth with 10,500 last week and 13,500 the previous week, obviously carried along at the steady rate which has been imposed by the bottleneck in the production of front-end suspension units (reported in THE IRON AGE, Nov. 17).

Large Christmas Sales Expected

Looking ahead, automotive men see a sizable bulge in sales and production for the Christmas season. Even though sales may lag in the early part of the new year, substantial production rates are assured while the factories build up dealers' stocks and prepare for the anticipated volume of spring sales.

Ford to Step Up Car Production

FORD MOTOR CO. announced Monday that production of Ford V-Eight and Mercury cars would be stepped up to 4000 units a day as rapidly as assemblies could be accelerated. For several weeks Ford production has been approximately 15,500 cars a week or 3100 a day. Thanksgiving week, with only four working days, daily output edged upward to nearly 3300 units.

Of the total projected weekly output, about 2000 or 10 per cent will be in new Mercury Eights.

There have been frequent inquiries about first quarter steel prices, and their announcement will be welcomed by the automotive buyers. Substantial tonnages will be placed during December, it is expected.

Studying Corrosion of Mufflers

A study of steel and other materials which might possibly be used for automobile mufflers is being carried on in numerous engineering research laboratories in Detroit. They are trying to find the reason for the increased number of failures of mufflers due to corrosion.

Two theories are being investigated, one having to do with corrosion caused by acids which condense out of automobile engine exhausts, the other concerned with the water which also condenses from engine exhaust. Regularly the products of combustion include acids, or acid gases, and this acid content, it is believed, is increased by some of the chemicals which are introduced in no-knock fuels.

Terne plate has been used with some success, although the heat of the exhaust tends to destroy the protective coating. Sample mufflers made entirely of copper are being tried out, and in some case bi-metallic mufflers, or those with special protective coatings, are being tested. The problem has become a serious one, with many mufflers corroding seriously and losing their effectiveness in a few months, or a few thousand miles of driving. It has become particularly serious in the last few years, leading to a reported increase in replacement business in mufflers to such an extent that many gasoline stations are keeping an assortment in stock.

Some engineers suspect that the

IT PAYS to buy tools that are engineered for the job. Pratt & Whitney Thread Milling Cutters are designed for P&W Thread Milling Machines, and when used together they produce beautiful accurate threads economically. You can be assured of top performance with this combination. P&W Thread Milling Cutters are the result of proper engineering design, steel selection, heat treatment and craftsmanship. A full range of sizes is listed in our new blue Small Tool Catalog No. 15. Have you a copy? It is free to anyone who will request it on his company letterhead.

PRATT & WHITNEY

Division Niles-Bement-Pond Co. **Hartford, Conn., U.S.A.**

problem may have been accentuated by the current design trend which places mufflers at the extreme rear end of the car, running transversely across the frame just forward of the rear bumper. The long passage from the engine to the muffler through the exhaust pipe cools the gas and might cause an undue amount of condensation to be trapped in the muffler, causing the corrosion.

Metal-Clad Airship May Be Built in Detroit

A metal-clad airship costing $3,000,000 may be built in Detroit or Akron, Ohio, as a result of recent action of the Navy Department in preparing to ask for bids for the construction of a new dirigible airship, probably of the all-metal type. This aircraft would have a specified length of 325 ft. maximum. The suppositions that the craft, authorized by Congress as a replacement for the *Los Angeles*, might be metal-clad and might be built in one of these two cities, hinge on the fact that the Navy has before it a technical report recommending a metal-clad airship of this size and tentative estimates of performance, submitted Nov. 15 by Carl B. Fritsche, president of the Metalclad Airship Corp. Fritsche headed the group which built the all-metal ZMC-2. This aircraft, only 150 ft. long, is now in its tenth year of continuous active service at the Naval Air Station, Lakehurst, N. J. The proposed new dirigible would have an air displacement of 1,260,000 cu. ft., maximum speed of 90 miles an hour, and a cruising range of 6.7 days at 40 miles per hour, when engaging in convoy duty.

Because Detroit has no airship hangar large enough to house the proposed craft, recommendations made by Fritsche for this construction include the options of lengthening of the present airship hangar on Grosse Ile, Detroit, by 200 ft.; use of one of the Government hangars on a rental basis, or use of the Goodyear-Zeppelin Corp. hangar at Akron. To this end, Fritsche has proposed joining the engineering staffs of the Goodyear-Zeppelin organization and the Metalclad Airship Corp.

Larger Exports Predicted

The export of American-made automobiles in increasing numbers is predicted to take place during 1939. One of every five vehicles manufactured in American plants is sold in markets outside of the United States, according to the Automobile Manufacturers Association. It is estimated that 475,000 cars and trucks will be sold abroad this year, or 22 per cent of production, as compared with 13 per cent last year.

"This proportion of output destined for foreign countries is the highest in the history of the industry," according to Robert C. Graham, who is vice-president of Graham Paige Corp. and chairman of the A. M. A. Export Committee. He foresees the possibility of increasing exports in 1939 to something like 680,000 vehicles.

The recent trade pacts negotiated with Great Britain by Secretary of State Cordell Hull will be of tremendous benefit to automotive manufacturers, even though duties on American motor vehicles have not been changed appreciably. Arvid L. Frank, president of the Studebaker Export Corp., believes that the improved position of the American farmer under the trade pact will be reflected in greater farm prosperity in this country and improved purchasing power which will increase the domestic automotive market.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

NOW, LISTEN -- I DON'T HUNT, SO I DON'T NEED A SHOTGUN! IF I DID HUNT I WOULDN'T TAKE A CHANCE ON ONE, BECAUSE YOU GUYS NEVER RAFFLE 'EM OFF TILL TH' HUNTIN' SEASON IS OVER -- SO BEAT IT!
SHOTGUN? OH, I SEE.... WELL, FLANNEL MOUTH, THIS HAPPENS T'BE RHEUMATISM I'VE GOT IN THIS LEG!
THIS IS A BAD TIME OF YEAR TO HAVE A GAME LEG -- THEY ALL THINK YOU'RE HIDING A SHOTGUN, AN YOU HAVE TO TAKE A LOT OF INSULTS
RAFFLIN' OFF TH' GOLF BAGS IN TH' FALL IS TH' ONES YOU CAN'T MISTAKE -- TRYIN' TO CONCEAL ONE OF THOSE MAKES YOU LOOK LIKE A CIRCUS FREAK!
T. M. REG. U. S. PAT. OFF.
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THE PANTS-LEGGERS
J.R.WILLIAMS 11-25

Britain Orders 80 Bombers in Canada

TORONTO, ONT.—Sir Kingsley Wood, Secretary for Air, announced in the House of Commons, London, England, that an agreement had been signed between his government and Canadian aircraft manufacturers for an initial $10,000,000 order for large bombers. To handle this business Canadian Associated Airways, Ltd., a company formed and controlled by six Canadian aircraft companies, received the contract. The participating companies are Fleet Aircraft Ltd., National Steel Car Corp., and the Ottawa Car & Mfg. Co., in the Ontario group; Canadian Vickers, Ltd., Canadian Car & Foundry Co., and Fairchilds Aircraft Ltd., in the Quebec group. Work will be started immediately on plant extensions and the installation of new equipment as it is stated speed production is required.

Two assembly plants, costing $500,000 each, will be erected at Malton, Ont., and St. Hubert, near Montreal, Que. Each of the six companies will provide its own working capital for manufacturing parts, while the Canadian Associated Aircrafts Ltd., will

provide capital for the assembly plants.

The initial order calls for 80 bombers of the Hampden type with delivery to be made in 1940. Additional contracts to follow may over the next 10 years reach a total of $250,000,000. Additional orders, it is stated, will take in plants at Fort William, Ont., and Vancouver, B. C., and also will include aircraft of more diversified types.

The airplane that is to be constructed under the new contract, in which the various companies concerned will share in the production of parts to be assembled at the central assembly plants, the engines to be provided by England, will be the Handley Page bomber, known as the Hampden type. It is a twin-engined, mid-wing monoplane, and will be equipped with Bristol Pegasus XX's radial engines developing up to 1000 hp. The bombers have provision for a crew of four, with a span of 69.4 ft. and length of 52 ft. and height of 14 ft. 4 in. There are two defensive gun stations.

French Iron and Steel Output Still Low

LONDON (By mail).—French steel production for September, figures of which have just been issued, amounted to 467,000 tons, against 419,000 tons in August—the lowest of the year—and 672,000 tons in September, 1937. Pig iron output totaled 446,000 tons, against 419,000 tons in August and 685,000 tons in September, 1937.

In both cases output was the lowest for the month of September in the last 10 years, with the exception of 1932. Iron ore exports totaled 1,262,000 tons, compared with 1,311,000 tons in August and 1,735,000 tons in September, 1937.

Swedes Turns to U. S. For Farm Machinery

WASHINGTON.—The Swedish Cooperative Union, which recently purchased 50 tractors and a considerable number of harvesting machines and other agricultural implements of American manufacture, is convinced that it would be more economical to purchase agricultural machinery from the United States than to manufacture such machines in Sweden, the Commerce Department reports. Among other things the Union proposes to purchase 280,000 electric pumps, and thousands of lathes and circular saws in the United States.

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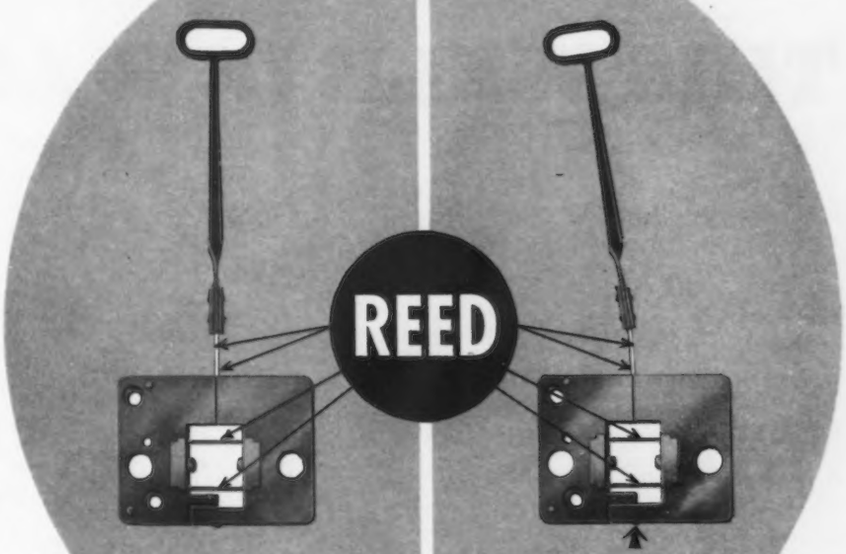
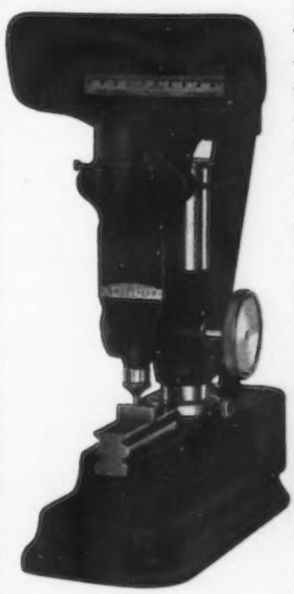


AND DEADLY ACCURATE



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THIS WEEK IN WASHINGTON

. . . Green opposes using Government's taxing power to promote profit-sharing plans . . . Manufacturers hold varying views . . . Roosevelt seen angling for assurances a proposal uniting AFL and CIO won't fail.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON.—Hearings before a subcommittee of the Senate Finance Committee have disclosed varying views respecting incentive taxation, with individual employer witnesses generally urging it, while President William Green of the American Federation of Labor said the federation "is unalterably opposed to using the taxing power of the Government to promote profit sharing plans." The National Association of Manufacturers opposed incentive taxation as an employment regularization medium.

Mr. Green declared strongly against amending the Social Security Act to provide tax credits for funds allotted to profit sharing "or any similar purpose, however worthy they may be in themselves." There apparently is no prospect of any incentive legislation at the forthcoming session of Congress, if at all.

Chairman George M. Verity of the American Rolling Mill Co., Middletown, Ohio, expressed the opinion that any profit sharing plan by industry should be voluntary and not made compulsory by a legislative incentive act.

Vice-president W. G. Marshall of the Westinghouse Electric & Mfg. Co., told the committee that Westinghouse's profit sharing plan has been found mutually satisfactory and beneficial to management and to workers. President Walter D. Fuller of the Curtis Publishing Co. said he believed incentive taxation would result in absorption of most of the unemployment of the country. Letters endorsing the principle of profit sharing were received from a number of employers.

Tax Rebate For Expansion

A communication from Chairman George Doubleday of Ingersoll-Rand Co. proposed a 5 per cent tax allowance to companies which set aside a special fund for plant expansion and replacements in periods of slack business. C. F. Brewer of Ernst & Ernst, accounting firm, submitted a letter which suggested that the Government match, by special income tax deductions, the amount paid by employers to employees in a profit sharing plan. Senator Herring, Democrat of Iowa, chairman of the subcommittee, said that the committee hopes to establish evidence that profit sharing plans actually raise the profits of industry. Several of the plans investigated by the committee, he said, have demonstrated that increased industrial efficiency has been brought about by the desire of employes to boost the profits in which they share.

Mr. Verity said that legislation which would compel profit sharing or penalize those who do not do it would be almost equally harmful.

"In our experience we have always felt that actual profit sharing as such —that is, a sharing in net earnings at the end of a considerable period— should only be applied to those responsible for management, whose work can only be measured by final results," Mr. Verity said.

Flexibility Is Urged

"All incentive plans or programs that permit men to earn more than a fair day's wage for a fair day's work can and should be considered profit sharing as they represent the only practical way to provide a fair distribution of the fruits of industry."

Mr. Verity said that flexibility of plans for distribution of extra income to industrial workmen is essential. He contended that any rigid formula upon various types of industry or different occupations within a single industry would be unworkable. In pointing out that Armco has different plans for production workers, salesmen, executives, etc., Mr. Verity said that, as an instance, production employees "prefer to work under some plan that gives them their fair share of results secured as they go along, rather than wait for a distribution of profits, which they do not understand, at the end of some definite period."

Mr. Marshall described the Westinghouse wage adjustment system and said a "base rate" is fixed for the wage of each employee. When earnings exceed $600,000 within a three-month period, he explained, wages are increased 1 per cent for each $60,000 above that figure, while a deduction is made at the same rate when quarterly earnings are less than $600,000. He said that any cut is in the number of hours worked, not in the pay per hour and employees making $125 a month or less are not subject to deductions. The plan was declared to have added 10 5/6 per cent to wages in 1936 and 13.3 per cent in 1937.

Cooperative Study Proposed

Mr. Fuller said that tax studies might be made with particular value in the building and heavy machinery industries. Speaking of profit sharing plans in themselves, he proposed cooperative study with the National As-

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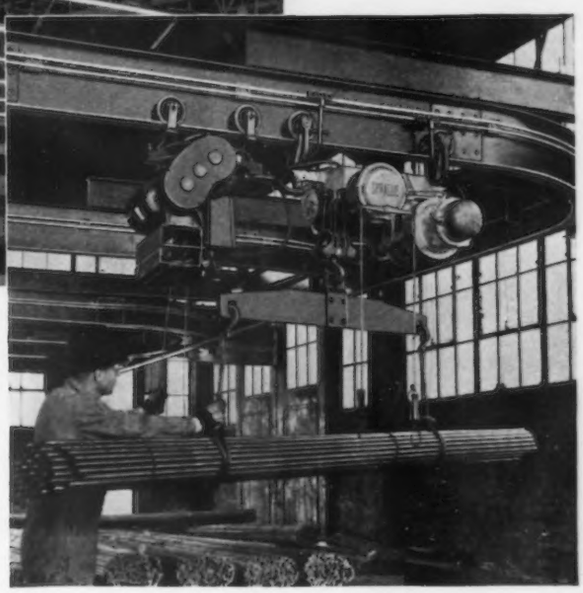

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sociation of Manufacturers and the Chamber of Commerce of the United States. Saying that there are possibilities for the use of tax incentives as direct aids in the relief of unemployment, Mr. Fuller suggested careful weighing before application of such proposals and cooperation with such national organizations as the American Institute of Accountants and the Controllers' Institute of America.

Mr. Fuller said companies should be allowed to charge off more for depreciation than present tax minima permit and that industrial plant expansion would follow. The opinion was offered by Mr. Fuller that the low rates of depreciation allowed under present tax laws have been a major factor in the delayed recovery of the capital goods industries.

Costs Available to Unions

Mr. Green said that all of the terms and conditions of payment for work should be determined through joint conferences of representatives of management and workers concerned, carried to mutual agreement upon issues discussed. He said that labor cannot be asked to accept blindly management's decision on what constitutes profits. He listed prerequisites which he held essential to a profit sharing plan.

He set them forth as follows:

"(1) Production and costs records must be equally available to union and management.

"(2) Sales policies must be considered by both parties and be mutually acceptable. All records must be equally available to both sides.

"(3) Salaries of executives and officers and returns to investors must be subject to the same conditions.

"(4) Financial policies and proposals must be subjected to the same review and decisions.

"(5) The standard wages of producing workers, which are production charges should be fixed by collective bargaining at the highest level industry could reasonably be expected to pay and should provide for customary standards of living proportionate to productivity as human labor power is increased by mechanical power and machine tools, and reflecting lower unit production costs. The standard wage is the cost item which is the first charge in industry and which is necessary to the sustained consuming power upon which all business depends.

"(6) Profit-sharing or a partnership wage is the share which labor would have in the net income of the enterprise. In reality labor is a partner in production, not from the investment of capital, but from the investment of experience and work ability. As a partner labor would have a voice in determining rates of profit sharing."

The views of the National Association of Manufacturers were presented by H. Boardman Spalding, chairman of the association's finance committee. While the organization opposed incentive taxation except as it exists under State unemployment compensation laws as a means of regularizing employment, Mr. Spalding said it had arrived at no conclusion respecting tax relief for companies having profit sharing plans. The association felt, he said, that if conceded the principle of incentive taxation, "it would have to concede the other side—punitive taxation."

Senator Questions N.A.M.

Senator Vandenberg, Republican of Michigan, chief sponsor of the pro-

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posed legislation, expressing surprise at the position of the association, said it was in conflict with views of "thousands of employers," and as to the implication of punitive taxation added that "they'll get that anyway." Mr. Spalding submitted a resolution which the association's executive committee had adopted saying, in part, that "any such (incentive) tax treatment in the general tax laws would tend to subsidize employers who find it economically feasible to regularize production and employment at the expense of those who are unable to do so."

"If the association is in favor of the merit-rating system in state laws, why is it not in favor of Federal incentive taxation?" inquired Senator Vandenberg. "It seems to me they applaud the only concrete example of incentive taxation and then condemn the principle."

F. D. R. Considering Plans to Unite Lewis and Green

WASHINGTON.—The Administration was seen angling this week for assurances that Presidential intervention in the three-year-old rift in the ranks of organized labor, if attempted, might stand at least some chance of success.

President Roosevelt from time to time has made a few feeble overtures in the direction of healing the breach, obviously fearful that any firm stand on his part would run the risk of failure. While there are some indications that the Administration now feels that chances of successfully sponsoring a peace conference between the two groups are much better in view of statements from the AFL and the CIO that their doors have not been closed to peace moves, key Government officials are believed to have determined that an end to the labor war is becoming increasingly necessary for a good many reasons.

Conference Possible

Presumably, the Administration's most conspicuous method of bringing the two groups together would be to call a White House conference. There have been recent hints of such a move but in general officials have shied away from the reports, although conceding that a conference, under certain circumstances, might go a long way towards ending the dispute between the adherents of craft and industrial unions.

Secretary of Labor Frances Perkins recently suggested that a peace committee be named to bring about a settlement, later conceded that this was just a "trial balloon," but emphasized that the desire for peace was growing in the membership of both labor factions. She and other New Deal officials have been reluctant to go into the matter further, pleading that anything they might say would retard peace prospects.

Welding Replaces Riveting In Swedish Shipyards

WASHINGTON.—Electric welding is gradually taking the place of riveting in Sweden's shipyards. It is now being used not only for lighter work but in bulkheads, tanks, and other parts, the Commerce Department reports. The saving in weight as compared with the riveting method is said by Swedish engineers to amount to approximately 20 per cent of the total steel weight and favors the shipowner by increasing carrying capacity.

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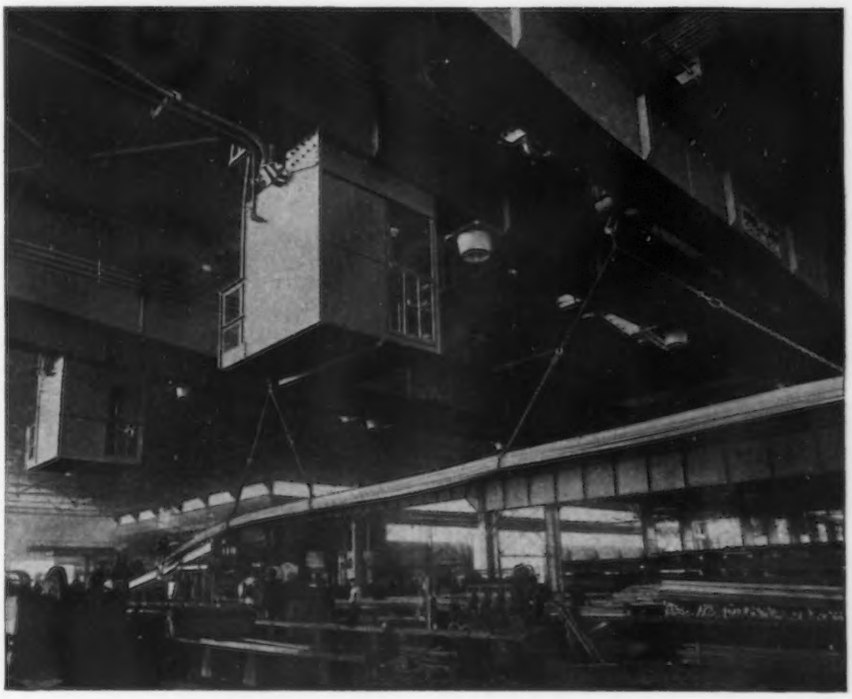

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Andrews Moves to Prosecute Wage-Hour Law Violators

WASHINGTON.—Prompted by the receipt of some 1200 complaints alleging violations of the Wage-Hour Act, Administrator Andrews has moved to set enforcement machinery into motion for the first time since the law became effective, Oct. 26. The Wage-Hour Division of the Labor Department is expected to select the most flagrant cases of violation and submit them to the Department of Justice for prosecution and investigation by a new unit established by the department for that purpose.

At the same time, possibility of court challenge was seen in the announcement by Andrews that the division regards as illegal any attempt by employers to reduce wages already above the 25c. minimum down to the bare minimum. Andrews cited Section 18 of the law which provides that "no provision of this act shall justify any employer in reducing a wage paid by him which is in excess of the applicable minimum wage under this act, or justify any employer in increasing hours of employment maintained by him which are shorter than the maximum hours applicable under this act."

He conceded this provision should be clarified to the extent of providing some specific penalty and expressed his intention to consider asking Congress to pass such a clarification.

Waivers Ruled Void

In the meantime, it was indicated, the Administrator, in attempting to bring violators of this provision into line, would undertake to determine by examination of company records whether wage cuts were a necessity because of curtailed business or whether a move to avoid compliance with the law.

Also, employees who agree with their employers to waive their rights to overtime rates of pay are still, nevertheless, entitled to the time-and-one-half wage rate specified by the law, and employers are proceeding illegally in resorting to such agreements of waivers, Andrews has ruled.

Absence of provisions in the act for fair trade practice provisions, which would round out the Wage-Hour law to make it comparable with the defunct NRA, may be supplied by a scheme under consideration by Thurman Arnold, head of the Justice Department's anti-trust division. Arnold, starting from the recent consent decrees signed by the Ford Motor Co., and the Chrysler Motor Corp., under which these companies agreed to rules of conduct in advertising plans for financing automobile sales, would build up a number of consent decrees to be used as a guide so that business firms will know which practices are within the law and which practices are taboo.

Supply Missing Link

Business groups have complained for years that the anti-trust laws as administered do not enlighten them as to what they can do without running afoul of the laws. Under Arnold's plan, rules formulated under a series of consent decrees would supply that missing link, thereby furnishing precedents for business to follow.

Of course, under the NRA the anti-trust laws were temporarily abrogated while under Arnold's plan they would be vigorously enforced with guide lines set up as a concomitant standard based upon the Justice Department's civil procedure—consent decrees.

Both the Wage-Hour Division and the Justice Department's anti-trust division are seeking substantial increases in staffs. Andrews' staff numbers about 210 persons and he hopes to add some 1000 additional just as soon as Congress supplies the necessary funds. Arnold has a crew of 75 attorneys but he hopes to employ some 150 additional ones as soon as possible to take care of expanding activities under his direction.

Ten of Mr. Arnold's attorneys in his anti-trust division were transferred to the department's new wage-hour division whose job will be to take care of all litigation involving alleged violations of the Fair Labor Standards Act. Joseph E. Brill, of New York, has been named head of the new unit.

Government Steel Contracts $776,878

WASHINGTON. — Government purchases during the week ended Nov. 19 totaled $776,878 for iron and steel products; $55,522 for non-ferrous metals and alloys; $608,248 for machinery; $770,115 for electrical apparatus and supplies; and $173,736 for transportation equipment. The awards follow:

IRON, STEEL PRODUCTS:

James B. Clow & Sons, Chicago, pipe	$10,145.71
Truscon Steel Co., Chattanooga, Tenn., reinforcing steel	13,278.84
Elliott Co., Jeannette, Pa., heaters	84,496.40
Edge Moor Iron Works, Inc., Edge Moor, Del., generating units	144,170.00
Bethlehem Steel Co., Los Angeles, fabricated steel	14,594.80
Bethlehem Steel Co., Los Angeles, fabricated steel	15,924.70
C. Frederick Wolfe, Inc., Brooklyn, metal work	14,100.00
Dravo Corp., Neville Island Branch, Pittsburgh, metal work	28,515.00
Consolidated Steel Warehouse Co., Philadelphia, metals	*16,483.00
Westinghouse Elec. & Mfg. Co., New York, assemblies, metal parts	111,000.00
National Tube Co., Pittsburgh, assemblies	99,375.00
National Tube Co., Pittsburgh, assemblies	124,600.00
National Tube Co., Pittsburgh, assemblies	100,195.00

NON-FERROUS METALS & ALLOYS:

Mueller Brass Co., Port Huron, Mich., brass forgings	$44,647.82
The International Nickel Co., Inc., New York, nickel, copper-alloy	10,875.00

MACHINERY:

Worthington Pump & Machinery Corp., Washington, D. C., compressors	$47,649.00
Nordberg Mfg. Co., Milwaukee, diesel engine parts	14,536.90
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, machining equip.	75,438.00
The National Acme Co., Cleveland, screw machines	34,144.95
E. I. du Pont de Nemours & Co., Wilmington, Del., charging machines	12,200.00
International Postal Supply Co., Brooklyn, N. Y., office equipment	*12,483.00
The Standard Register Co., Dayton, Ohio, billing mach.	Indefinite
Ruth Dredger Mfg. Corp., Ltd., Los Angeles, excavating machinery	17,995.00
Ruth Dredger Mfg. Corp., Ltd., Los Angeles, excavating machinery	11,975.00
Buffalo Pumps, Inc., Buffalo, N. Y., pumps	Indefinite
Caterpillar Tractor Co., Peoria, Ill., tractors	*10,126.00
Orton Crane & Shovel Co., Chicago, locomotive crane	14,606.00
Baldwin Southwark Corp., Eddystone, Pa., powder presses	208,800.00
S. Blickman, Inc., Weehawken, N. J., mechanical dippers	148,294.80

ELECTRICAL APPARATUS & SUPPLIES:

Westinghouse Elec. & Mfg. Co., Knoxville, Tenn., generator	$528,600.00
American Gas Accumulator Co., Elizabeth, N. J., lamp assemblies	68,295.00
The BG Corp., New York, spark plugs	84,872.32
The Wolfe & Mann Mfg. Co., Baltimore, control equip.	76,020.00
Weston Electrical Instrument Corp., Newark, N. J., ammeters	12,328.12

TRANSPORTATION EQUIPMENT:

Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J., motor assembly	$10,740.00
Coleman Motors Corp., Littleton, Colo., trucks	12,036.00
General Motors Corp. (Chev. Div.), Detroit, trucks	46,645.12
General Motors Corp. (Chev. Div.), Detroit, trucks	61,434.30
Yellow Truck & Coach Mfg. Co. (Gen. Motors Truck & Coach Div.), Pontiac, Mich., trucks	10,615.76
International Harvester Co., Inc., Washington, D. C., chassis	10,390.00
Mack International Motor Truck Corp., Philadelphia, tractor trucks & dump trailers	21,875.00

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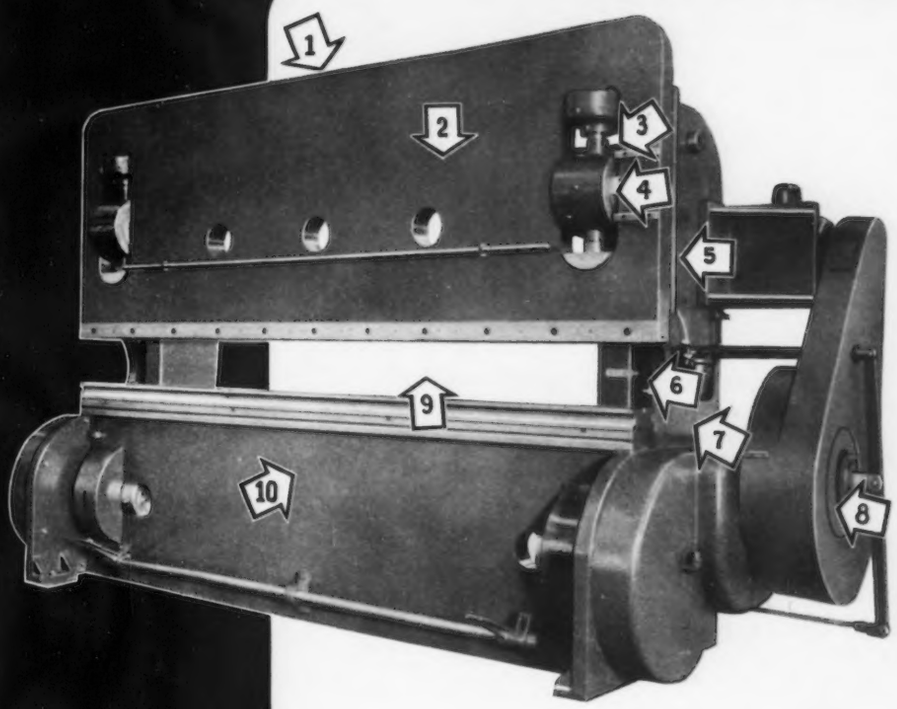

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U. S. Leading Sheet Supplier to Mexico

WASHINGTON. — The United States was the leading supplier of iron and steel sheets to Mexico in both 1936 and 1937 and maintained that position in the first six months of the current year, according to a report to the Department of Commerce from the office of the American Commercial Attache, Mexico City. Imports of iron and steel sheets into Mexico in the first six months of this year were valued at approximately $453,500 of which the United States accounted for about $329,300.

Steel Spiral Rod Standards Reaffirmed

WASHINGTON.—The Division of Simplified Practice of the National Bureau of Standards announces that Simplified Practice Recommendation R53-32, Steel Reinforcing Spirals, has been reviewed by the sponsoring organization, the Concrete Reinforcing Steel Institute, and reaffirmed without change. This move, establishing a recommended list of four sizes of steel spiral rods, represents a variety reduction of about 43 per cent. It became effective in 1927, was reaffirmed in 1930, and revised in 1932.

Monopoly Body Studies Effects of Patents

WASHINGTON.—The "use, distribution and pooling of patents" in the automobile and bottle glass industries will be the first subject to be considered by the Temporary National Economic Committee. It will be taken up after three-day introductory statements, beginning Dec. 1, are presented by Dr. Isador Lubin, Commissioner of Labor Statistics; Dr. Willard Thorp, Dun & Bradstreet, economist attached to the Department of Commerce, and Leon Henderson, executive secretary of the committee. The Government representatives will portray shifts in the "economic scene."

40 Steel Companies Reply To Monopoly Inquiry

WASHINGTON.—About 40 replies have been received by the Department of Justice from 70 letters asking steel companies how they keep their records, information desired in order to prepare a final Department of Justice-Federal Trade Commission questionnaire to be used in connection with an analysis of the steel industry for the Temporary National Economic Committee. Most of the replies have been received from small steel companies. It is hoped that a sufficient number of answers will be received so that the questionnaire can be whipped into final form and mailed to the entire steel industry next week.

Supreme Court to Rule On Sit-Down Dismissals

WASHINGTON. — Whether or not sit-downers cut themselves off from redress at the hands of the National Labor Relations Board will be determined by the Supreme Court. The Court has granted a petition of the Government to review a decision of the Seventh Circuit Court of Appeals in Lake County, Ill., which, by a two to one vote, set aside a board order requiring the Fansteel Metallurgical Corp., North Chicago, Ill., to reinstate 92 former employees, members of the Amalgamated Association of Iron, Steel and Tin Workers, CIO affiliate.

Westinghouse Sees Business Gain Soon

WESTINGHOUSE ELECTRIC & MFG. CO., announcing that it had made an extra payment in November of 3 per cent according to its wage and salary plan, this past week told its stockholders and employees that "the future looks brighter although there is no definite upturn in the amount of business being placed on the books of the company." The company reported that it expected that "improvements will be noticed in a relatively short time."

Blaw-Knox Engineers Organize Own Society

BLAW-KNOX CO. launched its intra-company engineering society recently with a meeting in Pittsburgh where 150 engineers heard W. P. Witherow, president, review growth of the company's engineering service and illustrate importance of closer relationship and united efforts among its research and technical staffs. Two papers, "Piping for Power Houses and Steel Mills," and "Centralized Grease Systems," were presented. Meetings will be held monthly.

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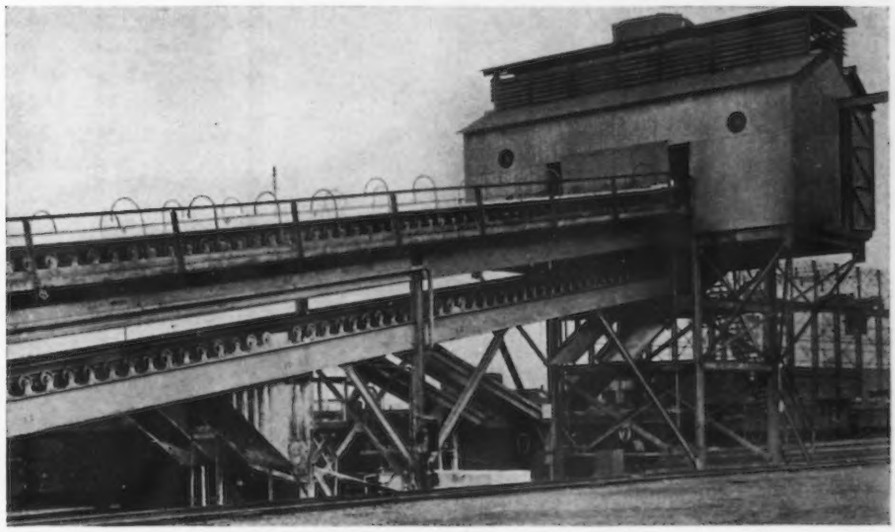

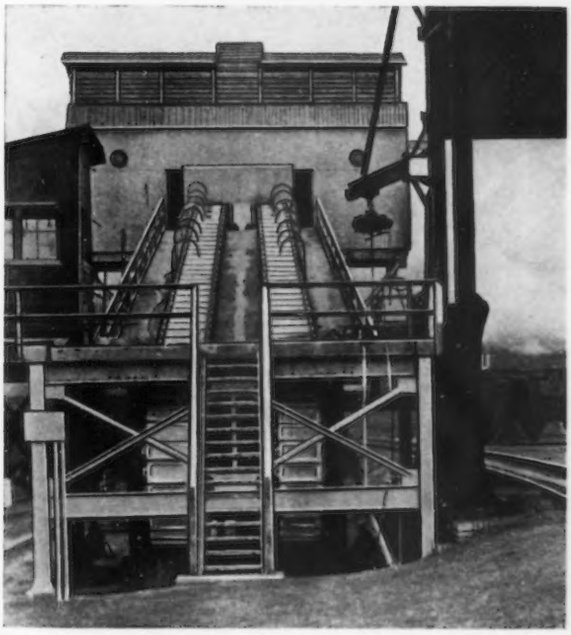

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2000-Ton High Speed Double Action Press

700-Ton High Speed Press

York, Pennsylvania, is famed the world around for the mechanical excellence of its manufactured products. To the favorable manufacturing factors afforded by this industrial community, this eighty-year-young organization has added hydraulic engineering experience which brings you a composite of the best engineering practice. On a wide variety of products Farquhar presses are lowering manufacturing costs. Perhaps they could for you, too. We would like to discuss that possibility with you.

A. B. FARQUHAR CO., Limited

Box H-62, **York, Pennsylvania.**

STEEL ROOFING

Every application of steel roofing and siding is covered in Continental's 14 styles. The new "Tyl-Lyke" with its wide rib design combines a new style in steel roofing with a new patented lap. All styles, in wide variety of lengths and gauges, are made from special analysis (or .20% minimum copper-bearing) basic open hearth steel, galvanized by the SUPERIOR PROCESS. Ridge roll and other accessories are furnished for all styles.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis

OPEN HEARTH STEEL

Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed.

Wire Rods, Nails, Staples, Bale Ties, Barbed Wire; Fence—15 Types; Gates and Fittings.

Sheets: Black, Galvanized, Special Coated; Roofing and Siding—14 Styles.

*Trade Mark Reg. U. S. Pat. Office.

CONTINENTAL

SHEET STEEL AND WIRE PRODUCTS

$4,219 Invested For Each Job

TOLEDO.—In eight typical industries it took $4,219 in machinery, buildings, land and equipment for each job in 1937, according to a special study of Toledo corporation statements and confidential information made for the Toledo Associates by certified public accountants.

Comparative data from 1929 to 1937 were used and the eight industries studied had 34,870 employees and 30,782 stockholders last year as compared with 15,715 employees and 17,910 stockholders in 1929, rated as a prosperous year.

The average investment per stockholder has decreased from $6,507 in 1929 to $4,780 last year, indicating that the diffusion of ownership has been increasing.

In this study it was shown that in some of the industries it requires as much as $27,490 investment per worker and in others as low an amount as $1,051 is invested per job.

Taxes of all kinds per employee were $258 last year and $223 for the lesser number of employees in 1929.

Soviet to Take World's Fair Building Back Home

THE pavilion of the Union of Soviet Socialist Republics at the World's Fair, covering more than 70,000 sq. ft., is being erected in such a way that it can be disassembled after the fair closes, shipped to the Soviet Union and erected there. The structure, requiring approximately 1200 tons of structural steel, will include a 170-ft. pylon. Builders are the Hegeman Harris Co., New York, and the American supervising architects are Pomerance & Breines, New York.

World Industrial Output Continues Marked Rise

FOR the third consecutive month world industrial production has shown marked improvement and world prices of leading raw materials and foodstuffs have risen slightly, according to a study of the National Industrial Conference Board's statistical division. Activity increased in September in the United States, Great Britain, Canada and the Scandinavian countries. Losses occurred in France, Germany, Belgium, Italy and Japan. Canadian industrial output rose 9 per cent during September.

Galvanizers Hold Chicago Meeting

UNUSUALLY large attendance and great interest in technical problems relating to the galvanizing industry marked the fall meeting of the Galvanizers Committee, at Chicago, Nov. 17 to 19, under the sponsorship of the American Zinc Institute.

More than 60 representatives from 19 steel companies, including two Canadian producers of galvanized sheets, attended the general sessions and participated in the inspection trips to the mills of Carnegie-Illinois Steel Corp., at Gary, and the Inland Steel Co. at Indiana Harbor. At each general session a formal paper of general technical interest was presented, after which followed informal round-table discussions of practical operating problems.

F. G. White, Granite City Steel Co., was re-elected chairman of the Governing Board, other members of which are G. A. Brayton, Newport Rolling Mill Co.; N. E. Cook, Wheeling Steel Corp.; R. H. Dibble, Carnegie-Illinois Steel Corp.; B. P. Finkbone, American Rolling Mill Co.; D. A. Russell, Youngstown Sheet & Tube Co., and J. L. Schueler, Continental Steel Corp.

Structural Steel At 12-Month High

NEW business booked by the structural steel fabricating industry in October was at a new 12-month peak, according to the American Institute of Steel Construction. During the first ten months of 1938 the industry booked 922,996 tons compared with 1,396,718 tons in the like period of 1937. October shipments totaled 137,642 tons against 92,469 tons in September and 62,267 tons in October, 1937.

Ferracute to Make, Bryant to Sell Rafter Press Brakes

FERRACUTE MACHINE CO., Bridgeton, N. J., has acquired the manufacturing rights for the Rafter steel press brakes, heretofore made by the Rafter Machine Co., Belleville, N. J. The Bryant Machinery & Engineering Co., 400 West Madison Street, Chicago, has assumed exclusive selling rights and will market the line through its local dealers.

For the Undimmed Reputation of Your Products---

use Clark Bolts. Most bolts have mighty responsible jobs, and for 84 years Clark Bolts have been fashioned to the standard of meeting these responsibilities.

Order a trial quantity, your confidence in them will then be second only to ours.

BOLTS, NUTS, SCREWS, AND RIVETS

STANDARDS AND SPECIALS

LEE
Quality Springs
ALL SHAPES · ALL SIZES · ALL MATERIALS

LEE SPRING COMPANY, Inc.
30 MAIN STREET BROOKLYN, N.Y.

LEE-BUILT TRADE MARK SPRINGS

Tool Engineers Launch Study Of Machine's Effect on Jobs

ONE of the biggest tasks any engineering organization has undertaken—a nationwide fact-finding program to determine the effect the machine has had and is having on employment and standard of living—has been launched by the American Society of Tool Engineers. Every resource of the society is to be organized into a research bureau. In announcing the program, Walter F. Wagner, A.S.T.E. president, said:

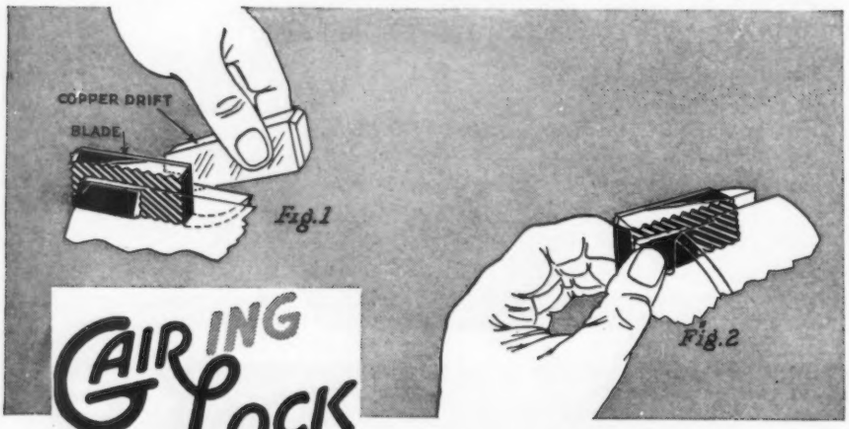
"There is probably no question as vital to society in general today, as the problem of what effect the machine is having on employment or unemployment—on raising or lowering the standard of living and income of the nation as a whole.

"Not a day goes by but that claims and counter-claims are propounded publicly to the effect, on the one hand, that the machine is creating unemployment—and, on the other, that the machine is responsible for increased employment and higher standards of living.

"The entire question is too vital to the future well-being of our nation and society to continue to be primarily a subject of debate. The American Society of Tool Engineers believes that only a complete knowledge of all contributing facts—properly analyzed and interpreted—can furnish the real answer.

John M. Younger, professor of industrial engineering, Ohio State University, and first honorary member of the A.S.T.E., will be general chairman of the fact-finding committee structure. The bibliography committee is scheduled to present its first report on March 13, the day prior to the opening of the Machine and Tool Progress Exhibition in Detroit.

LESS "DOWN TIME"



GAIRING LOCK

Cutter Blades Easily Adjusted

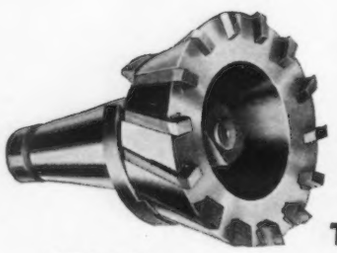
FACE MILL

This radically new design makes adjustment and reconditioning of cutter blades in milling cutters and boring bars easy, simple and quick.

Blades are adjusted forward to increase diameter. To loosen, a light tap on a drift at the rear end of the blade and at the front end of Gair-Lock relieves the frictional contact of the lock and the blade (See Fig. 1) leaving them both loose in the blade slot. They are then withdrawn MANUALLY for adjustment - see Fig. 2.

The projection is made while the unit is out of the body by moving the Gair-Lock one or more increments toward the back of the blade before inserting back into the body.

No gage or setting ring is required to accomplish accurate, uniform adjustment. The tool is out of service for a minimum period. There are eleven other important Gair-Lock advantages. Ask for Bulletin 601



SHELL MILL

The Gairing Tool Co., Detroit, Mich.
In Canada - Galt, Ontario
GAIR-LOCK BORING BARS AND MILLING CUTTERS -- SHELL, SIDE, FACE, INTERLOCKING, ALTERNATE TOOTH AND MULTIPLE DIAMETER

Public Contracts Board Found Advancing Wages

MINIMUM wages recommended by the Public Contracts Board for work on Government contracts are higher than actual minimum wages paid in most of the industries concerned and therefore tend to raise wage costs, according to a recent study of the Economic Research Division of the National Industrial Conference Board.

In a few cases, the minimum wage selected was based on an agreement between industry and labor, according to the Industrial Board, and for the cement industry the basic minimum rates paid for common labor were accepted by the Public Contracts Board. For most other industries, however, the wage chosen is not a minimum wage, but rather an average taken somewhere in the lower earnings classifications.

Baldwin Orders Under Total for October, 1937

ORDERS taken in October by the Baldwin Locomotive Works and subsidiaries, including the Midvale Co., totaled $1,334,459 compared with $2,057,433 in October, 1937. On Oct. 31, consolidated unfilled orders amounted to $14,071,950 against $23,757,714 on Jan. 1, 1938.

. . . OBITUARY . . .

EDGAR L. VALANCE, assistant general manager of Houde Engineering Corp. and nationally known automotive engineer, died Nov. 24 at Buffalo, following an operation. Mr. Valance, who was 56 years old, was a member of the Society of Automotive Engineers.

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DOOR MILLER, a consulting engineer, was buried at Detroit, Nov. 23. For many years he was associated with the Dura Co. of Toledo and 15 years ago he organized the D-M Mfg. Co., maker of dairy supplies, and was its president.

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HAYDEN EAMES, 74 years old, a pioneer in the automobile industry and a former officer in both the United States Army and Navy, died Nov. 24 at Cleveland. With Percy Maxim, son of Sir Hiram Maxim, he organized the Pope Tube Co. in Hartford, Conn., in 1895. Two years later they organized the motor carriage department of the Pope Tube Co., and manufactured the old Pope-Hartford automobile. Mr. Eames also was one of the organizers of the Columbia Mfg. Co., Hartford, maker of an electric powered automobile. From 1907 to 1910 he was general manager of the Studebaker Automobile Co.

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FRANK G. SUTHERLAND, a former executive of the W. F. Stewart Co., one of the predecessors of the automobile industry at Flint, Mich., died Nov. 23 at his home in Flint at the age of 79. Starting his career in London, Ont., with the Thompson Buggy Co., he went to Flint 59 years ago to work for the Stewart Co. He served as superintendent and vice-president.

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F. JAMES BRIDGES, 51 years old, an engineer in the production department of the Ford Motor Co. of Canada, died Nov. 22 at his home in Windsor. He was a member of the Professional Engineers Association and the Canadian Engineering Institute.

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E. D. CROCKETT, for the past 30 years New England representative for Henry Prentiss & Co., New York, died at his home in Springfield, Mass., on Nov. 24, aged 56 years. He was graduated in mechanical engineering from Tufts College in 1905.

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IRA I. PADDOCK, district sales representative for the Colorado Fuel & Iron Corp. at Fort Worth, Tex., for more than 35 years, died in that city on Nov. 11, aged 68 years. He had lived at Fort Worth since 1903, when he went to Texas to open the territory for sales by the Colorado company. He was the company's oldest sales representative in point of service. He started in the steel business in 1892 as secretary to the plant manager of the Washburn & Moen Mfg. Co. at Waukegan, Ill. He later became identified with the Chicago office of the American Steel & Wire Co.

WILLIAM G. LANGDON, general manager of the Automatic Canteen Co., Detroit, died Nov. 22 at the age of 60. Formerly he was purchasing agent for the Michigan Stove Works; general sales manager of Midland Steel Co.; buyer for the Overland Motor Car Co., Toledo, and vice-president of the Automatic Ball Crank Co., Cincinnati.

❖ ❖ ❖

WILLIAM A. WARD, assistant managing director of Thomas W. Ward.

FOR FORGING Camshafts
ERIE HAMMERS Again
HERE is one of nine Erie Steam Drop Hammers in the forge shop of a nationally known maker of automotive and aviation forged camshafts . . . This 3,000 lb. Erie Steam Drop Hammer helps maintain minimum production costs for these vital parts . . . when you choose the Dependable Erie Steam or Board Drop Hammer, you protect your good name and assure highest quality forgings at costs which enable you to make more money . . . Why? Because Erie Engineers and Craftsmen Build Dependable Hammers . . . It's become a 38 year old Erie habit. Write for bulletin 328 Steam or Board.
ERIE
ERIE FOUNDRY CO.
ERIE, PENNSYLVANIA, U. S. A.
DETROIT
CHICAGO
INDIANAPOLIS
FRANCE
CANADA
ENGLAND
ERIE BUILDS Dependable HAMMERS

A Preview of

"THE METAL WORKING WORLD of TOMORROW"

in

THE IRON AGE *issue January 5, 1939*

For the first time in Business Paper Advertising

you have an opportunity to plan your selling efforts a full year ahead. Mr. Van Deventer, Editor of The Iron Age, will initiate the most helpful and effective campaign ever attempted by any publication.

It will be for the purpose of aiding industrial executives in the metal-working industry to revive and broaden profit margins through the one means left to management—increased productivity at lower cost.

Just as your automobile mirror enables you to take a look behind while you still have your major gaze on the road ahead, so will the forthcoming Annual give you definite data on which to base your general judgment and at the same time direct your main attention to cost-cutting methods as a help in 1939.

Here then is an opportunity for you to tie in your advertising promotion with the new editorial theme. It should and will pay dividends.

MAIN LINE OF THE METAL WORKING INDUSTRY
THE IRON AGE
239 WEST 39TH STREET • NEW YORK CITY

Go Down the Road to Sales with The Iron Age

The Program Starts January 5, 1939

What Space Shall We Reserve for You?

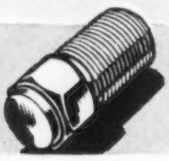
RESISTANCE

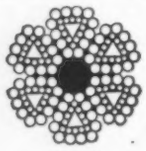
TO HIGH PRESSURE

MANY thousands of high pressure requirements have been successfully met in the past 25 years by the special alloy boltings designed and produced by Erie's special threading developments, special alloys and *unswerving precision* . . . When you specify Erie bolting, you are sure of the *extra factor* of *safety* so necessary in high pressure applications. Present your problem to us now.

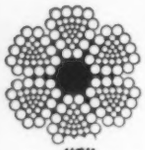
ERIE BOLT & NUT CO.

1345 LIBERTY ST. ERIE, PENNSYLVANIA

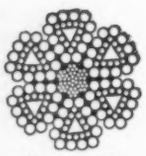




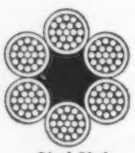
Style B Flattened Strand



"B" Flattened Strand



Wire Rope Center



Steel Clad

You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

–PREFORMED–

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions

Made Only By

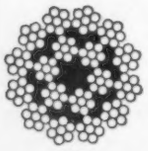
A. LESCHEN & SONS ROPE CO.

Established 1857

5909 KENNERLY AVENUE, ST. LOUIS, MO

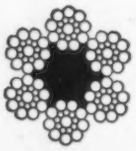
New York . . . . 90 West Street
Chicago . 810 W. Washington Blvd.
Denver . . . . 1554 Wazee Street
San Francisco . 520 Fourth Street
Portland . 914 N. W. 14th Avenue
Seattle . . 2244 First Avenue South

* Reg. U. S. Pat. Off.

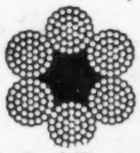


18x7 Non-Rotating

6x19 Filler Wire



6x19 Seale



6x37 Extra Flexible

8x19 Extra Flexible

Ltd., Sheffield, England, died at his home in that city on Nov. 11.

❖ ❖ ❖

CHARLES E. ST. CLAIR, works manager, Sivyer Steel Casting Co., Milwaukee, died in Springfield, Ohio, on Nov. 5, aged 52 years, while making a tour of foundries in that district.

Two Columbia Steel Plants Amalgamated

PACIFIC works of Columbia Steel Co., located at 16th and Folsom Streets in San Francisco, will be amalgamated with the Pittsburg, Contra Costa County works of the steel company effective immediately. Columbia is a subsidiary of United States Steel Corp.

While Pacific works will lose its identity as an individual plant, operations will be maintained as at present. In making known the change O. L. Pringle, vice-president in charge of operations, stated that henceforth the plant will be known as the rope and fence department of the Pittsburg works and will operate under the jurisdiction of William Cohn, general superintendent of the Pittsburg plant.

Lakey Foundry & Machine Finishes Year in Black

LAKEY FOUNDRY & MACHINE CO., Muskegon, Mich., finished the fiscal year ended Oct. 31 "easily in the black" according to J. O. Ostergren, vice-president. Net profit for the year was $125,052. The diversified business is an important factor in the company's earnings, it was stated. Lakey now supplies 17 prominent manufacturers with castings. Business is divided almost evenly between automotive and other lines.

McKee Issues Steel Booklet

CLEVELAND.—A 42-page book titled "A Brief Outline of the Magnitude and Character of the Iron and Steel Industry in the United States," has been published by Arthur G. McKee & Co., Cleveland, engineers and contractors. Originally prepared for distribution to the members of the British Iron and Steel Institute and the Institute of Metals of Great Britain, during their proposed visit in October, the publication was in an advanced stage when the trip was canceled and it was concluded to publish the data anyway. Copies have been mailed to the British delegation.

Bethlehem Merges Ship Subsidiary

BETHLEHEM STEEL CORP. has announced that Bethlehem Shipbuilding Corp., Ltd., has been merged into Bethlehem Steel Co., as a further step in the program of consolidating various subsidiaries of the Bethlehem Steel Corp., which was begun in 1936.

All business heretofore conducted by Bethlehem Shipbuilding Corp., Ltd., will be conducted by a new division of Bethlehem Steel Co. created to take over Bethlehem's shipbuilding and ship repair activities. These activities will continue under the supervision of S. W. Wakeman, vice-president, with headquarters at 25 Broadway, New York, and Quincy, Mass.

Generated Power Increased Without Increase in Fuel

ADDITIONAL electrical power without the use of additional fuel can be obtained in many existing power plants by the application of either high or low pressure turbines to existing units, L. E. Newman, turbine specialist for the General Electric Co., told the Association of Iron and Steel Engineers meeting at Birmingham, Nov. 28.

By "topping" turbines with a high pressure unit, 25 to 50 per cent more power can be obtained from the same quantity of fuel burned, and in cases where waste steam is available at about atmospheric pressure, the addition of low pressure condensing turbines will generate more power at no increase in fuel cost, according to Mr. Newman.

"When you consider that the usual condensing turbine, operating with a main pressure of 200 to 400 lb., will require a yearly expenditure for steam supplied it equal to its purchase price, savings in the power house loom large as a potential source of increased profit," he said. Topping turbines pay biggest dividends when the existing main pressure is low and fuel is expensive.

Sheet & Tube Votes Preferred Dividend

YOUNGSTOWN. — Directors of Youngstown Sheet & Tube Co. have declared a regular preferred dividend of $1.37½, payable Jan. 1, to stock of record Dec. 17.

This new blade type RIDGID cutter wheel assures you

Quick, clean

low cost

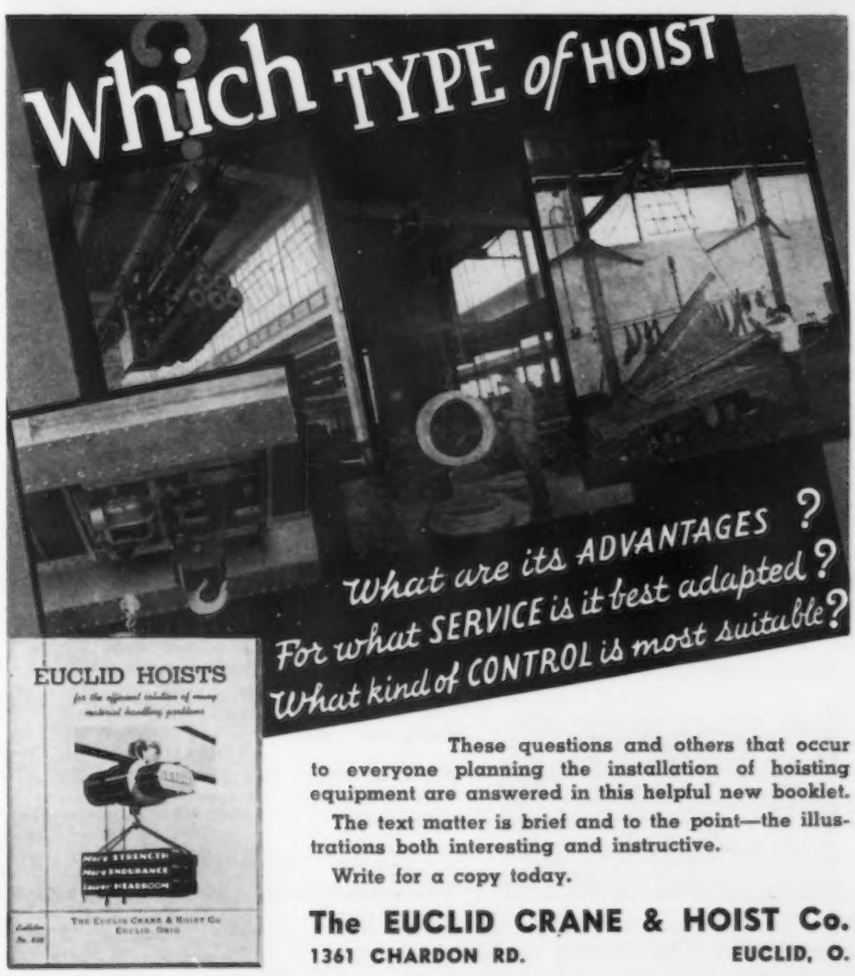
pipe cutting

Like the blade of a good knife, this RIDGID cutter wheel blade is made of fine tool steel—for more cutting power and stamina. Where ordinary wheels are cut from bar stock, RIDGIDs are coined from tool steel sheets, hammered, heat-treated and cast into a solid hub. Many more cuts per wheel, quicker cutting, practically no burr . . . And thousands of users will tell you that this steel reinforced cutter, guaranteed not to break or warp, always cuts true, twirls easily to size, stands the gaff of hard use. For a tool a good workman can take pride in, for speedier, better work and less cutter wheel expense, buy the RIDGID. Ask your Supply House—today.

THE RIDGE TOOL CO., ELYRIA, O.

Makers of the famous guaranteed RIDGID Pipe Wrench

RIDGID PIPE TOOLS


Which TYPE of HOIST
What are its ADVANTAGES ?
For what SERVICE is it best adapted ?
What kind of CONTROL is most suitable?
EUCLID HOISTS
for the efficient solution of many material handling problems
THE EUCLID CRANE & HOIST CO
EUCLID, OHIO

These questions and others that occur to everyone planning the installation of hoisting equipment are answered in this helpful new booklet.

The text matter is brief and to the point—the illustrations both interesting and instructive.

Write for a copy today.

The EUCLID CRANE & HOIST Co.

1361 CHARDON RD. EUCLID, O.

TRADE NOTES

Foote Bros. Gear & Machine Co., Chicago, has appointed as representatives Murray-Baker-Frederick Co., 715 Linden Avenue, Shreveport, La., for northern Louisiana and southern Arkansas, and Lloyd C. Taylor, P.O. Box 113, Richmond, Va., for Virginia.

Claude B. Schneible Co., 3951 Lawrence Avenue, Chicago, manufacturer of Multi-Wash dust collecting equipment, has appointed as its representatives O. W. Anderson, Los Angeles, for southern California; Robert M. Taylor Co., San Francisco, northern California; King Machinery Co., Cambridge, Mass., the New England states; R. F. Skarnes, Minneapolis, for the North Central territory, and Guy H. Rumpf, for the St. Louis territory. L. C. Beers has been appointed assistant sales manager at Chicago.

Union Chain & Mfg. Co., Sandusky, Ohio, has appointed as its sole sales representative in the Detroit area C. E. Phillips & Co., 2750 Poplar Street, Detroit.

Joseph T. Ryerson & Son, Inc., Jersey City, N. J., announces that Timken seamless mechanical tubing in more than 1000 sizes of S.A.E. 1015 low carbon analysis, finish anneal, sizes ranging from 3/16 in. o.d. up to 12 in. o.d., is now available for immediate shipment. The Ryerson company has issued a new booklet on Timken tubing.

Hewitt Rubber Corp., Buffalo, has appointed as distributers: Joseph Glenn & Sons, Philadelphia; Tools & Supplies, Inc., Indianapolis; Campbell Hardware & Supply Co., Seattle; Laurance Belting Co., New York City, and Everson Electric Co., Allentown, Pa.

Samuel I. Winternitz & Co., is liquidating the Bessemer Foundry & Machine Co. plant at Bessemer, Ala., and is offering for sale a foundry building and equipment, machine shop building and equipment, an office building and other property.

Union Boiler & Mfg. Co., Lebanon, Pa., announces that Seamless Steel Equipment Corp., 39 Broadway, New York, has been appointed as its eastern representative.

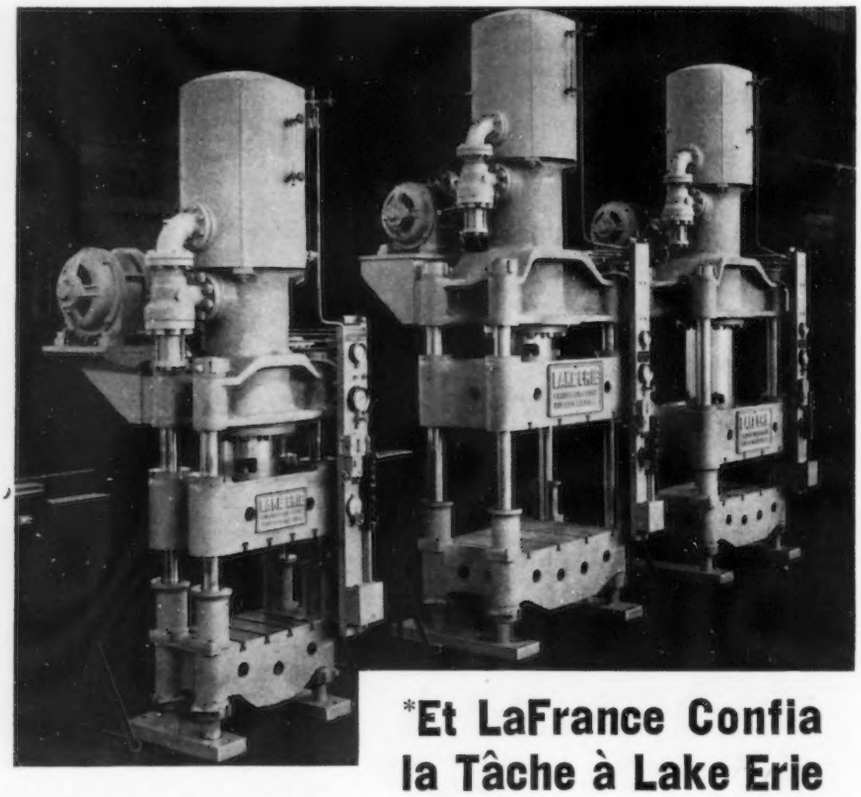
George Ronn, representative of the Sterling Grinding Wheel Sales Co., Tiffin, Ohio, has located his office in Detroit at 222 E. Milwaukee Avenue, Detroit.

Meehanite Metal Corp., Pittsburgh, announces the licensing of the following companies to manufacture Meehanite Metal under the Meehanite processes: Valley Iron Works, St. Paul, Minn.; Barnett Foundry & Machine Co., Newark, N. J.; Herbert Morris Ltd., Loughboro, Eng.; Douglas Fraser & Sons Ltd., Arbroath, Scotland.

Horace T. Potts Co., Philadelphia, announces that its Elastuf group of related machinery steels, formerly distributed in the East entirely through Potts warehouses in Philadelphia and Baltimore, and through Brown-Wales in Boston, can now also be obtained in the Buffalo and New Orleans warehouse areas through Beals, McCarthy & Rogers and Equitable Equipment Co., respectively.

Paramount Rubber Service, Inc., 1430 Rosedale Court, Detroit, has taken over all functions of Collord, Inc., with the exception of manufacture of rubber covered parts for the automotive industry on a high production basis. The departments covered by Paramount include the dip department for the rubber coating of metal units of all kinds, the production of seamless rubber lined tanks, and the manufacture of Surfaseal rubber paints.

Combustion Engineering Co., Inc., New York, has opened a branch office in Birmingham, Ala., with J. B. Emory as district manager, assisted by W. E. Johnson. The address is 516 Martin Building.



*And France "Put It Up to LAKE ERIE"

*Et LaFrance Confia la Tâche à Lake Erie

The three Lake Erie Hydraulic Presses shown above are part of an order for over a dozen being built for France for airplane manufacture. Ranging from 175 to 2500 tons capacity, these presses are to be used for general stamping work covering a wide range of parts produced in volume and semi-production quantities.

New high speeds . . . new die savings through the use of wood, cast iron and other inexpensive material . . . forming dies working against rubber pads . . . quick interchangeability and setting of dies . . . simplified automatic push button control . . . self-contained pumping unit,—those are just a few of the exclusive developments in HYDRAULIC presses which are establishing new economy standards in producing an ever widening range of products.

You are invited to "Put it up to Lake Erie" by writing an outline of your requirements.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

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Continental Can to Build New Plant at Oil City, Pa.

CONTINENTAL CAN CO., INC., New York, has announced the acquisition, through a Pennsylvania subsidiary, of property in Oil City, Pa., consisting of seven and a half acres on which will be constructed a modern can manufacturing plant and warehouse. Production will consist primarily of refinery sealed oil cans.

Pennsylvania Builds Two Heavy Duty Freight Cars

TWO new types of heavy duty freight cars, designed for handling massive machinery and electrical apparatus, very large steel shapes and plates and similar products, have just been turned out at the Pennsylvania Railroad's Altoona works. One car is of "well-hole" design, with the bottom deeply depressed between the trucks, and has an all-over length of 52 ft. 8 in. and width of 10 ft. 5 in., while the second heavy-duty car, built with a massive steel body cast in a single unit, has two four-wheel trucks at each end of the car, distributing the load over 16 wheels. Among the products which the cars can handle are large electric generators, motors and transformers, steam turbines, ship propellers and stern frames, armor plate, heavy bridge girders and large castings.

Granite City Steel Job Goes to Cleveland Firm

CLEVELAND.—Dingle-Clark Co., Cleveland electrical contracting firm, has received a contract covering the design and installation of the electrical construction work required for an addition to the Granite City Steel Co. plant at Granite City, Ill.

Molding Material for Non-Ferrous Metals

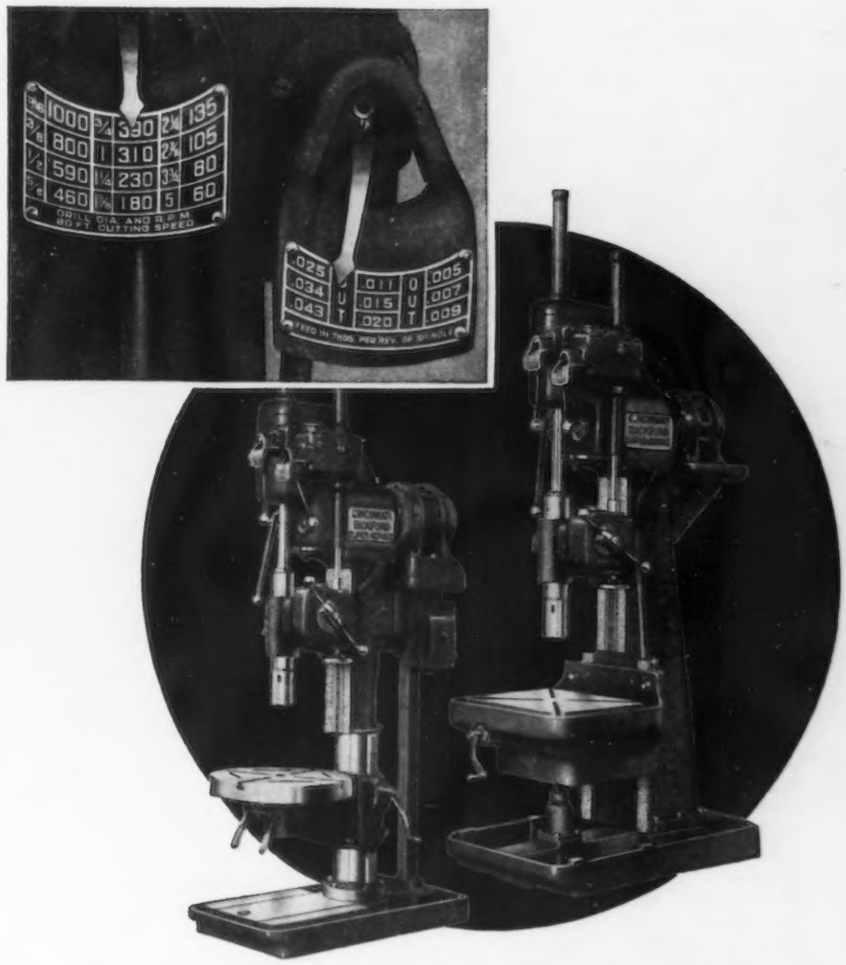
(CONTINUED FROM PAGE 39)

nical advantages of the mold material due to its high permeability, great mechanical strength, and freedom from scaling. It is equally adaptable to work usually done in box parts as well as work usually struck up in loam. It is not, however, recommended for small work normally done in green sand, but for all work usually done in dry sand or loam the process possesses remarkable possibilities. It is being very successfully used for light alloy castings for the automobile and airplane engine industry in France, and for most heavy and complicated bronze castings.

The author hopes that in this short article he has indicated the possibilities that are present in investigating new molding materials and methods in two directions—one of improving the general physical characteristics of the alloys and the other with the object of cheapening production and removing some of the many difficulties associated with non-ferrous foundry practice.

1937 Blast Furnace Output 36,770,313 Tons

WASHINGTON.—Blast furnace production of pig iron and ferroalloys in 1937 aggregated 36,770,313 gross tons of which 25,101,900 tons was basic and 5,742,729 tons was bessemer iron, according to the Bureau of the Census. Merchant output was 6,738,190 tons. The 1937 pig iron-ferro production, valued at $642,719,198, compared with 21,163,896 tons, valued at $358,797,163, produced in 1935. Ferro production rose to 629,334 tons from 389,241 tons, with by-products valued at $6,870,686, the 1937 value of blast furnace output was $672,525,407, compared with $374,651,370, in 1935. Wage earners in 1937 numbered 23,075, an increase of 52 per cent over 15,178 reported for 1935, and wages paid, $38,001,438, exceeded the 1935 figure, $18,915,554 by 100.9 per cent. The number of establishments reporting for 1937 was 87 compared with 72 in 1935.



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A wide range of useful drilling speeds and feeds, instantly available by direct reading single lever control, promotes rapid and efficient operation. Write for Bulletin U-22 giving full particulars.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

. . . THE NEWS IN BRIEF . . .

More About What Industry's Opinion of The Election Effects on Business.—Page 53A.

Automobile production may reach 100,000 weekly rate for first time this year. . . . Heavy steel buying expected soon.—**Page 54.**

England places $10,000,000 order for bombing planes in Canada; additional contracts over next 10 years may reach $250,000,000.—**Page 56.**

French iron and steel output still low.—**Page 57.**

Swedish Cooperative Union finds it more economical to buy U. S. agricultural machinery, plans to purchase pumps, lathes, saws.—**Page 57.**

William Green opposes using Government's taxing power to promote profit-sharing plans for industrial employees.—**Page 58.**

President Roosevelt weighs chances for making successful peace overtures to heal breach between AFL and CIO.—**Page 61.**

Electric welding of bulkheads and tanks gains in use at Sweden's shipyards, the Commerce Department reports.—**Page 61.**

Administrator Andrews moves to prosecute Wage-Hour Law violators after receiving 1200 complaints. —**Page 62.**

Government steel purchases in latest reported week total $776,878; machinery awards, $608,248.—**Page 62.**

United States in 1937 and again in the first six months of 1938 was the leading supplier of steel sheets to Mexico.—**Page 64.**

Business improvement will come soon, Westinghouse Electric & Mfg. Co. tells its stockholders and employees.—**Page 64.**

One hundred and fifty engineers of various Blaw-Knox Co. divisions unite to form own engineering society.—**Page 64.**

Supreme Court will decide whether or not employers can dismiss employees who seize plants in sit-down strikes.—**Page 64.**

Forty steel companies so far have replied to Monopoly Committee letters asking how they keep their records.—**Page 64.**

Monopoly Committee studies effects of patents in automobile and bottle glass industries.—**Page 64.**

World industrial output and prices of leading raw materials continue to rise for third consecutive month. —**Page 66.**

Soviet erects World's Fair building so it can be moved back to Russia after fair's end.—**Page 66.**

Toledo finds it takes $4,219 investment to make a job for one workman, finds diffusion of industrial ownership is rapidly increasing.—**Page 66.**

Orders for structural steel booked during October were higher than for any month in the past 12, the American Institute of Steel Construction reports.—**Page 67.**

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MEETINGS

Dec. 5 to 9 — American Society of Mechanical Engineers, New York.

Dec. 5 to 10—National Exposition of Power and Mechanical Engineering, New York.

Dec. 15—Grinding Wheel Manufacturing Association, Atlantic City, N. J.

Dec. 16—Abrasive Grain Association, Atlantic City, N. J. .

Jan. 10 to 12—Institute of Scrap Iron and Steel, St. Louis.

Jan. 9 to 13—Society of Automotive Engineers, Detroit.

Galvanizers hold Chicago meeting.—**Page 67.**

Baldwin Locomotive Works, including Midvale Co., reports orders lower in October than in like period of 1937.—**Page 68.**

American Society of Tool Engineers launches nationwide study of effects the machine has had on jobs and the country's standards of living.—**Page 68.**

Findings of Public Contracts Board are raising wage costs for American industry, National Industrial Conference Board study shows.—**Page 68.**

Arthur G. McKee & Co. issues a booklet, "A Brief Outline of the Magnitude and Character of the Iron and Steel Industry in the United States."—**Page 72.**

Columbia Steel Co., subsidiary of United States Steel Corp., merges its Pacific and Pittsburg (Cal.) works.—**Page 72.**

Lakey Foundry & Machine Co. finishes year "in black," finds automotive industry now providing about half its business.—**Page 72.**

Bethlehem Shipbuilding Corp. becomes the shipbuilding division of Bethlehem Steel Co. in a merger announced by Eugene G. Grace.—**Page 73.**

Youngstown Sheet & Tube Co. votes regular dividend on preferred shares.—**Page 73.**

Continental Can Co., Inc., subsidiary acquires land for building new sealed oil can plant at Oil City, Pa.—**Page 74.**

Pennsylvania builds two heavy duty freight cars.—**Page 75.**

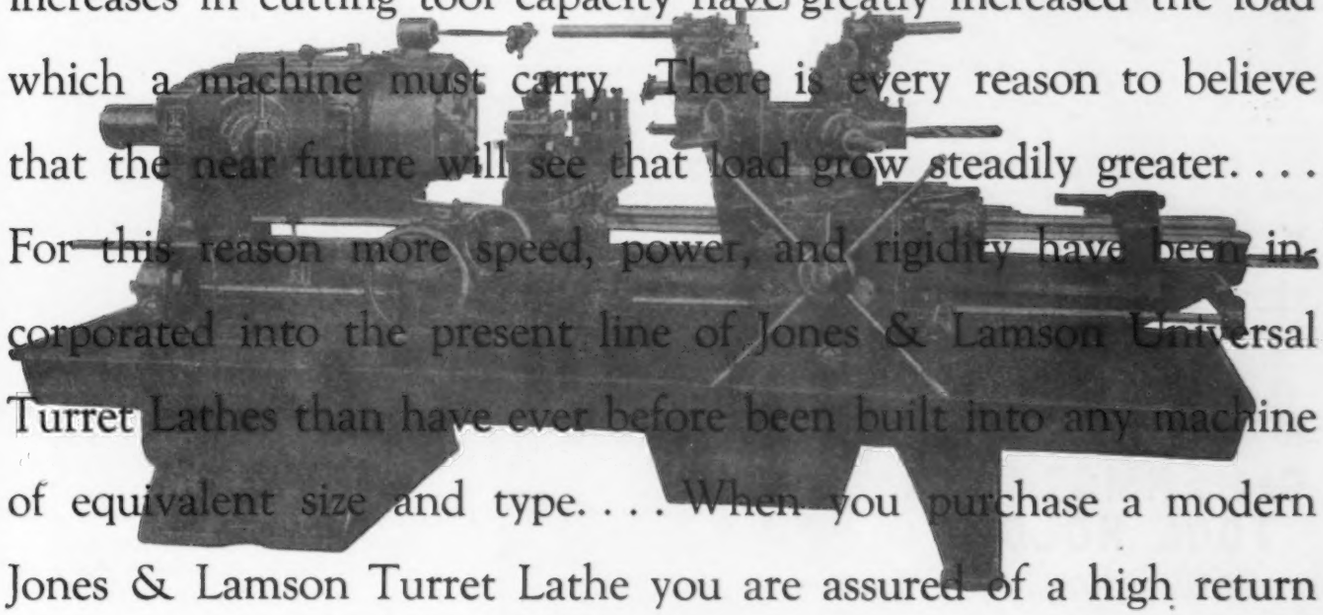
Granite City Steel job goes to Cleveland firm.—**Page 75.**

1937 Blast Furnace Output 36,770,313 tons.—**Page 75.**

Freuhauf Trailer orders 2000 wheel assemblies.—**Page 82.**

Wheeling Corrugating Co. erects an office building and warehouse in St. Louis.—**Page 106.**

IN 1848, the parent companies of Jones & Lamson designed and built their first Turret Lathe. Continuously and actively, these companies, and their successor, the Jones & Lamson Machine Company, have been improving the design and increasing the capacity of Turret Lathes. These modern machines are the result of a background of experience, coupled with scientific studies of machining problems, cutting tools and machine design. . . . Recent increases in cutting tool capacity have greatly increased the load which a machine must carry. There is every reason to believe that the near future will see that load grow steadily greater. . . . For this reason more speed, power, and rigidity have been incorporated into the present line of Jones & Lamson Universal Turret Lathes than have ever before been built into any machine of equivalent size and type. . . . When you purchase a modern Jones & Lamson Turret Lathe you are assured of a high return from every dollar invested; of ample speed, power, and rigidity to carry the burdens imposed by present-day cutting tools, and of capacity to stand up and deliver at a profit under the load which will surely be imposed upon it by the future development in carbide tools or in some other hard alloy. ☆ ☆ ☆



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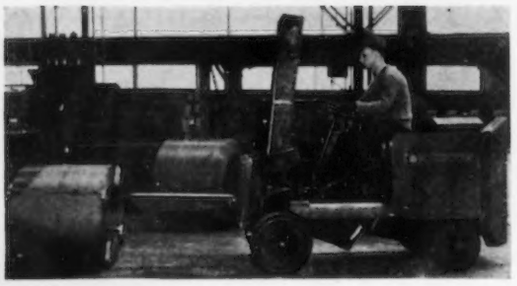
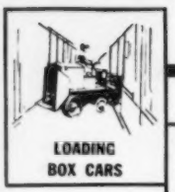
TOWMOTORS CLEVELAND

PAY DIVIDENDS in STEEL PLANTS





Material handling, transportation and distribution are the important topics today in determining the possibilities of future dividends to offset past losses in many plants. Waste in material handling is still a problem in many places. But the answer is simple.

TOWMOTOR lift trucks and tractors offer a lower initial cost and a lower maintenance cost for handling most anything up to 6000 lbs. per load. When lower costs are combined with both smoother and faster operation, you have something worth while.

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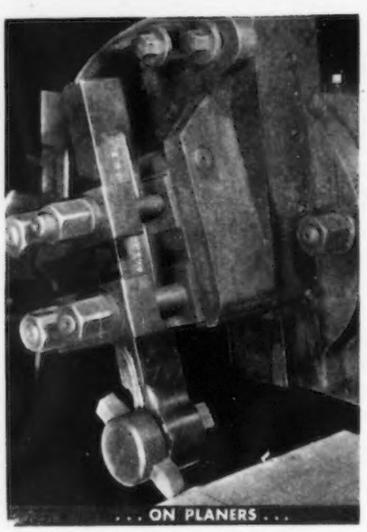

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. . . PERSONALS . . .

T. W. PENNINGTON has been appointed sales manager, Jessop Steel Co., Washington, Pa., with headquarters at Washington. Mr. Pennington has been with the company for the past several years as district manager in Cleveland, where he has been succeeded by F. P. MCGAHAN, formerly service manager at Washington.

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WILLIAM B. POINDEXTER has been appointed general sales manager, Pittsburgh Coal Co., Pittsburgh, succeeding WALTER L. SHEPPARD, who becomes assistant to the sales vice-president.

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JOHN W. VOTYPKA, who has been chief engineer for the Le Baron division of the Briggs Mfg. Co., Detroit, for 12 years, has been named chief engineer of the Fruehauf Trailer Co. Mr. Votypka is assistant vice-chairman in charge of automobile body activity for the Detroit section of the Society of Automotive Engineers. WILLIAM R. MYERS, who for the last four years has been manager of the Meldrum Avenue plant, Detroit, for the Briggs company, has been named Fruehauf plant manager.

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W. HOMER HARTZ, president of the Morden Frog & Crossing Works, Chicago Heights, Ill., has been nominated as president of the Illinois Manufacturers' Association. Mr. Hartz has been active for several years as a director of the association and his company is one of the charter members. Both before and after his graduation from Purdue University in 1907, he had several years of varied experience with the engineering corps of the Chicago, Southern & Pacific Railways, now part of the Chicago, Milwaukee, St. Paul and Pacific Railroad; the Baltimore & Ohio Railroad, and the Oliver Iron Mining Co. He was also engaged for a period with S. B. Chapin & Co., brokers. In 1911 he became associated with Morden, manufacturer of railway track material, as draftsman, being promoted respectively to inspector, chief clerk, purchasing agent, secretary, treasurer, assistant manager of sales and vice-president. He has been president of that company since 1930.

Other officers nominated for consideration at the annual meeting which will be held Dec. 13 at the Stevens Hotel, Chicago, are: first vice-president, J. E. OTIS, JR., Stewart-Warner Corp., Chicago; second vice-president,

ROBERT M. GAYLORD, Ingersoll Milling Machine Co., Rockford; treasurer, STERLING MORTON, Morton Salt Co., Chicago.

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W. O. BATES, JR., who was made head of the patent department of the Caterpillar Tractor Co., Peoria, Ill., a few weeks ago, has been appointed a vice-president of the company.

FRANK A. FREY, whose appointment as president and treasurer of Geuder, Paeschke & Frey Co., Milwaukee, was announced in these columns last week.

J. STANLEY MCCORD, formerly of the Cleveland office of Bliss & Laughlin, Inc., Chicago, has been made district manager of the Philadelphia office, with headquarters in the Otis Building.

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H. F. DEVENS, chairman of the board, Oliver Iron & Steel Corp., Pittsburgh, has changed his headquarters from Pittsburgh to the company's New York office at 50 Church Street.

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RALPH HARE has been made New England representative of the Electro-Alloys Co., Elyria, Ohio, and will make his headquarters at West Hartford, Conn.

❖ ❖ ❖

W. A. TIPTON, manager of packing sales of the mechanical goods division, United States Rubber Products, Inc., has been appointed a director of the

. . . ranging from those made of heavy bar or rod, hot coiled—to tiny springs made from fine piano wire. In all GIBSON Springs, an elaborate system of scientific control insures accuracy to specifications. Only a large well-equipped plant can turn out such quality springs at ordinary prices. Design engineering service on request.

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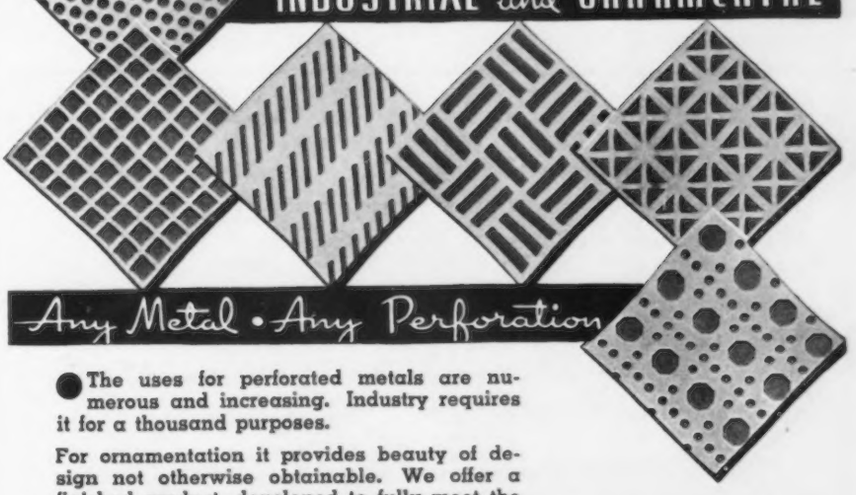

● The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

The Harrington & King PERFORATING Co.

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New York Office, 114 Liberty Street

rubber division of the Mechanical Packing Association.

❖ ❖ ❖

ARDEN L. KNIGHT, for the past 12 years identified with the metallurgical and sales departments of Wheelock, Lovejoy & Co., Inc., Cambridge, Mass., has been appointed district manager of sales in New England, with offices at 128 Sidney Street, Cambridge, Mass. Before going to the home office in 1926, he was engaged in sales and contact work at the company's Cleveland and Detroit offices.

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MERRILL E. PRATT has been elected president of the Continental Gin Co., Birmingham. He succeeds ALGERNON L. SMITH, who desired to retire as president. Mr. Smith was elected vice-chairman of the board. Mr. Pratt is a graduate of the University of Alabama and Massachusetts Institute of Technology.

"CLEAN ENOUGH" COSTS MONEY

In the metal industry there's no such thing as "clean enough". The word is *clean*. Anything else costs money. You can't afford to take chances with half-way jobs or half-way cleaners.

Wyandotte Metal Cleaners go all the way on every job. That's where they save you money. Wyandotte Metal Cleaners clean things *clean*. We build them that way. "Clean enough" isn't good enough for Wyandotte—and it isn't good enough for you.

If you would like to clean up your metal cleaning problems, our representative will be glad to call on you. Send us a card today.

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DISTRICT OFFICES IN 26 CITIES

HARVEY L. RAMSEY, for a number of years sales manager of J. D. Wallace & Co., Chicago, has been made sales promotion manager for the Porter-Cable Machine Co., Syracuse, N. Y.

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GUY C. BEISHLINE, for the past year special assistant on the staff of the vice-president in charge of operations, American Car & Foundry Co., New York, has been appointed district manager in charge of Berwick, Pa., plant of the company, succeeding WILLIAM S. JOHNSON, who has retired after 53 years of service with the company and its predecessor. Mr. Johnson started his career in the rolling mill of the Jackson & Woodin Co., which later merged with other independents to form the American Car & Foundry Co. He rose through various steps until he reached the district managership on May 1, 1921.

Mr. Beishline was plant manager, vice-president and director of the Mt. Vernon Car & Mfg. Co. before becoming associated with the American Car & Foundry Co.

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BARNEY H. RUBINE, of Hudson Iron & Metal Co., Bayonne, N. J., has been reelected president of the New Jersey chapter of the Institute of Scrap Iron and Steel. W. ABRAMSON, of A. Abramson & Sons, Inc., Newark, N. J., has been elected first vice-president; ISRAEL CITRON, of the Citron-Byer Co., Trenton, N. J., second vice-president, and HOWARD ISAAC, of Abraham Isaac, Inc., Elizabeth, N. J., third vice-president.

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HOWARD C. M. CLARK has been appointed manager of sales, sheet division, Carnegie-Illinois Steel Corp., Pittsburgh. He was formerly general manager, order division, and succeeds AVERY C. ADAMS, resigned. MR. CLARK joined Carnegie Steel Co. in 1927, and subsequently became assistant manager of sales, Detroit district office, and later manager of the order division until his recent appointment. He is a graduate of the United States Naval Academy.

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JOHN N. MARSHALL, assistant general manager, fabricated steel department, Bethlehem Steel Co., Bethlehem, Pa., and R. H. MCCLINTIC, assistant to the president, Koppers Co., Pittsburgh, have been elected to the board of trustees and executive committee of

Koppers United Co., Boston. This company has substantial investments in Koppers Co., Pittsburgh, and in Eastern Gas & Fuel Associates, Boston.

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AVERY C. ADAMS has resigned as manager of sales, sheet division, Carnegie-Illinois Steel Corp., Pittsburgh, to accept a position as vice-president and assistant general manager of sales, Inland Steel Co., Chicago.

Mr. Adams' experience in the steel industry began in 1919 when he joined

AVERY C. ADAMS

Trumbull Steel Co., Warren, Ohio. After working three and a half years in the mill, he subsequently became salesman, district manager of sales, and assistant general manager of sales. In May, 1928, he left Trumbull to become manager of tin plate sales, Republic Steel Corp., Youngstown. In July, 1928, he joined General Fireproofing Co., Youngstown, as vice-president in charge of sales and director, which position he held until June, 1936, when he went with Carnegie-Illinois.

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R. J. SCHULER, general sales representative, Union Drawn Steel Division of Republic Steel Corp., has been appointed assistant manager of sales, bolt and nut division, with headquarters in Cleveland. Mr. Schuler became associated with Republic last spring after serving 13 years in various sales capacities with LaSalle Steel Co., and becoming general manager of sales.

CAST IRON PIPE

Wayland-Lincoln, Mass., have taken under advisement bids on 600 tons of 6, 8 and 10-in. pipe and fittings.

Acton, Mass., will close bids Dec. 10 on about 3½ miles of pipe and fittings.

New York, construction of Major William F. Deegan Boulevard in Bronx, 1200 ft. 12-in. pipe; bids received by president, Borough of Bronx, until Dec. 5.

Walnut Grove, Mo., plans about 13,670 ft., various sizes, for water system; also new 50,000-gal. elevated steel tank on 125 ft. steel tower. Cost about $32,000. Financing has been arranged through Federal aid.

Hazelton, Iowa, plans about four miles, various sizes, for water system; also elevated steel tank and tower. Cost about $30,000. Special election has been called Dec. 15 to approve bond issue. Ralph W. Gearhart, 349 Twenty-first Street, S.E., Cedar Rapids, Iowa, is consulting engineer.

Batesville, Ind., plans 2, 3, 4, 6 and 10-in. pipe for extensions in water system; also fittings. J. C. Eckert, Osgood, Ind., is consulting engineer.

Pardeeville, Wis., closes bids Dec. 7 for 3010 ft. of 8-in. and 2780 lin. ft. of 6-in. pipe

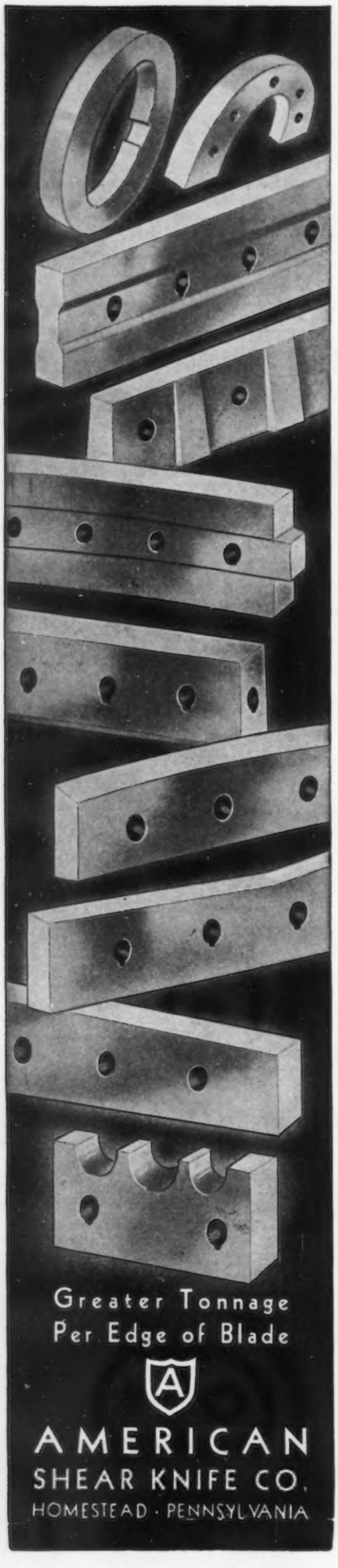
STAMPINGS

Range: Regular and special stampings from material up to ½" thickness. Deep drawn metal work of satisfying accuracy.

Reliability: 25 years of successful experience. Serving both large and small users in YOUR industry daily.

Resources: A complete plant including most modern stamping machinery associate equipment for spot-welding, enamelling, tapping, and etc. We manufacture our own dies.

LANSING STAMPING COMPANY
SO. PENN. AVENUE, LANSING, MICHIGAN



for water system; also for fittings and 40,000 to 50,000-gal. elevated reservoir. General Engineering Co., City Bank Building, Portage, Wis., is consulting engineer.

Duncan, Neb., asks bids until Dec. 6 for pipe lines for water system and other waterworks installation. Financing has been arranged through Federal aid. Henningson Engineering Co., Union State Bank Building, Omaha, Neb., is consulting engineer.

Lawson, Mo., plans pipe lines for water system and other waterworks installation. Cost about $45,600, of which $25,000 will be a bond issue, recently voted, with remainder of fund secured through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., is consulting engineer.

Pearl Beach, Mich., plans pipe lines for water system and other waterworks installation. Cost about $30,200. Financing has been arranged through Federal aid. Pate & Hirn, Michigan Building, Detroit, are consulting engineers.

Akron, Ohio, will ask bids soon for new force pipe line in Mud Run district for main water supply. Cost about $50,000.

Hillsboro, Ill., plans pipe line extensions in water system and other waterworks installation. Cost about $78,181, of which $35,181 will represent a Federal grant. Warren & Van Praag, Inc., Millikin Building, Decatur, Ill., are consulting engineers.

Lockhart, Tex., will receive bids about Dec. 15 for pipe lines for water system and other waterworks installation. Cost about $180,000, of which $81,000 will represent a Federal grant. Homer Trimble, 605 Bellevue Place, Austin, Tex., is consulting engineer.

Cadwell, Ga., plans about 4000 ft. of ½-in. to 6-in. pipe for water system; also 60,000-gal. elevated steel tank and tower and other waterworks installation.

Grand Falls, Tex., plans about 13,000 ft. of 6-in. pipe for water system; also 50,000-gal. elevated steel tank and tower and other waterworks installation. Bond issue of $36,000 has been authorized. H. T. Cunningham is engineer.

Modesto, Cal., has awarded 133 tons of 4 to 12-in. pipe to United States Pipe & Foundry Co., San Francisco.

Jacksonville, Ore., water system improvements include 247 tons of 4, 6 and 8-in. pipe purchased from Pacific States Cast Iron Pipe Co., Provo, Utah, through Soule & Walters, Elma, Wash., contractor.

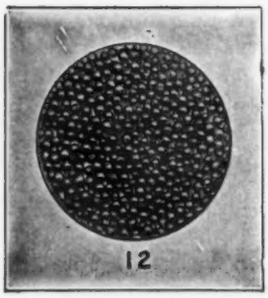
Laguna Beach, Cal., aks bids Dec. 17 (tentative date) on water system improvements, including 4200 ft. of 8-in., 10,400 ft. of 6-in., 19,000 ft. of 4-in. and 7200 ft. of 2-in. pipe, concrete reservoir, 120,000 gal. steel reservoir, and pumps.

Seattle, Wash., has opened bids on 4000 ft. of 6-in. (Class 150), 3500 ft. of 6-in. (Class 250), 5200 ft. of 8-in., and 2500 ft. of 4-in. pipe.

Orem, Utah, has purchased 280 tons of cast iron pipe from Pacific States Cast Iron Pipe Co., Provo, Utah, for water system.

Freuhauf Trailer Orders 2000 Wheel Assemblies

DETROIT COMPENSATING AXLE CO. has been awarded a contract to supply upward of 2000 differential-dual wheel assemblies to the Freuhauf Trailer Co., delivery to begin Dec. 1 and continue 12 months. The Detroit company will quadruple its production facilities, Robert W. Canfield, president, said.



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Unusual quality is creating demands for both our Heat-Treated Chilled Shot, and Heat-Treated Steel Grit.

One contract calls for 300 tons of our steel grit; another contract calls for 250 tons of our Special Heat-Treated Shot. Many carload lots of both shot and grit.

There must be a reason for this, and the reason is plain: namely, unusual quality; prompt deliveries; uniform quality the year round; satisfactory prices.

Send samples of the sizes you are now using. We will match any size, and name prices that will interest you.

We manufacture a shot and grit that you will eventually use.

HARRISON ABRASIVE
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MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

. . . PIPE LINES . . .

Carnegie Natural Gas Co., Frick Building, Pittsburgh, plans new welded steel pipe line from gas field in Fayette County, near uniontown, Pa., to Clairton, Pa., for natural gas transmission. Line will run through Fayette and Greene Counties, with submarine line under Monongahela River. Connection will be made with main pipe line of company at terminus noted, leading to Pittsburgh for increased natural gas distribution for industrial consumers in that area. Work is scheduled to begin early next year. Cost close to $500,000 with control stations and other operating facilities.

Mississippi River Commission, Vicksburg, Miss., asks bids until Dec. 5 for 18 lengths, each 40 ft., of 6-in. spiral riveted or welded steel pipe, with forged or cast steel black flanges; 15 sheet steel fittings, 10 pairs of cast steel flanges and four gate valves (Circular 5).

Water Department, Denver, plans new steel pipe line for main water supply, replacing an existing wooden trunk line, with alternate bids to be asked on cast iron pressure pipe and concrete pipe. Cost about $283,000, of which $127,350 will represent a Federal grant. Extensions and replacements also will be made in distribution mains in city limits, to cost about $34,400, of which $15,480 has been secured through Federal aid.

Water Department, Bellingham, Wash., George Brock, water superintendent, plans extension of steel pipe line in State Street for main water supply. New reservoir at Lake Whatcom, filtration plant, pumping station, etc., also will be built and extensions made in pipe lines for water supply in Fairhaven Hill section. Cost $562,500. City Council has authorized project.

Metropolitan Water District of Southern California, 306 West Third Street, Los Angeles, F. E. Weymouth, chief engineer, asks bids until Dec. 9 for 980 ft. of mortar-lined steel pipe for Palos Verdes reservoir, Colorado River aqueduct, for which bids are being asked at same time.

Montana-Dakota Utilities Co., Minneapolis, Minn., has applied for permission to import natural gas from Canada into United States for transmission and distribution at Great Falls, Mont., and vicinity. Gas is now being gathered by Almont Pipeline Co., Ltd., a subsidiary of first noted company, under agreement with Range Oil & Gas Co., Ltd., of Canada.

Akron, Ohio, will take bids Dec. 1 for 770 ft. of 30-in. cast iron or steel water pipe and 6000 ft. of 24-in. cast iron or steel pipe. Approximate tonnage in steel pipe is 380 tons.

Huntington City, Utah, is considering use of steel pipe for new main water line from water source in Huntington Canyon to present reservoir near city limits, about nine miles; also about 47,760 ft. of 4 and 6-in. for system in city. Fund of $50,900 has been secured through Federal aid.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Dec. 7 for pipe; also for valves, unions, elbows, nipples, crosses, tees and other fittings (Circular 13).

United States Engineer Office, Bonneville, Ore., will receive bids until Dec. 9 for power house construction at Bonneville dam project, including 28,500 lb. of black steel pipe; 13,400 lb. galvanized wrought iron pipe, and 15,500 lb. of flanged cast iron pipe; also 72,000 lb. of steel castings; 41,600 lb. of steel rails; 15,000 lb. of steel floor gratings. L. W. Bixby is engineer of contracts and purchases.

Treasury Procurement Office, San Francisco, has awarded 8000 ft. of 8-in. pipe to Southern Pipe & Casing Co., Azusa, Cal., for delivery at Lindsay, Cal. (Invitation 6419).

Bureau of Reclamation, Denver, has awarded 2,000,000 ft. of 1-in. black pipe and 15,000 bends to Steel & Tubes, Inc., Cleveland.

SHEET STEEL HANDLING

C-F SHEET LIFTERS

5 ton Lifter in storage dept.

20 ton Lifter in 80" strip mill.

SAFER

Tong action and automatic take up safely grip loads. End control protects operator.

BETTER

High grade stock handled without surface scratches or damage to edges.

CHEAPER

Handle packs of sheet steel instead of single sheets. Sheet storage room reduced.

FASTER

Jaw adjustment made in a few seconds. One man control.

Also made for handling tinplate, ingot molds, paper rolls, pipe, tubing, castings, tote boxes, flasks, skids, etc. Capacities 2 to 60 ton. Special designs to suit your requirements.

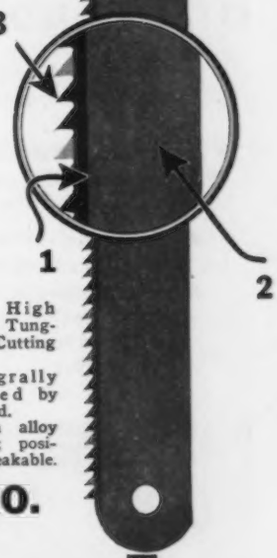
CULLEN-FRIESTEDT COMPANY

1303 S. Kilbourn Avenue — Chicago, Illinois

MARVEL

MARVEL SAWS AND BLADES

Tomorrow's Blades TODAY!



Thousands of users; in fact, everyone who knows cutting steels and tools recognizes that MARVEL High-Speed-Edge Hack Saw Blades are far-and-away the finest that can be made—that there is no equal steel—that only the patented composite MARVEL Blade can have this cutting edge and at the same time be positively unbreakable, in fact. Heavy duty high speed, automatic production sawing machines have been made practical only because of MARVEL'S high speed and unbreakable qualities. The cutting edge is of 18% Tungsten High Speed Steel, welded by a special process to a tough alloy back. Thus they are made *positively unbreakable.*

Increase the efficiency of your equipment—get higher running speeds and greater feed pressures, be assured of more cuts per dollar—turn to MARVEL High-Speed-Edge Hack Saw Blades!

1 18% High Speed Tungsten Steel Cutting Edge.
2 Integrally Fused by electric weld.
3 Tough alloy back; positively unbreakable.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

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Eastern Sales Office: 199 Lafayette St., New York

REINFORCING STEEL

. . . Awards of 6560 tons—8035 tons in new projects.

AWARDS

368 **Tons,** New York, addition, Veteran's Hospital in Bronx, to Truscon Steel Co., Youngstown, through Wilaka Construction Co., New York, general contractor.

280 **Tons,** Rochester, N. Y., Lexington Avenue tunnel sewer, to Bethlehem Steel Co., Bethlehem, Pa.; through F. L. Heughes & Co., contractor.

275 **Tons,** Aberdeen, Md., three buildings for officers, to Bethlehem Steel Co., Bethlehem, Pa.

100 **Tons,** Groton, Conn., sewerage disposal, to Concrete Steel Co., Boston.

CENTRAL AND WESTERN STATES

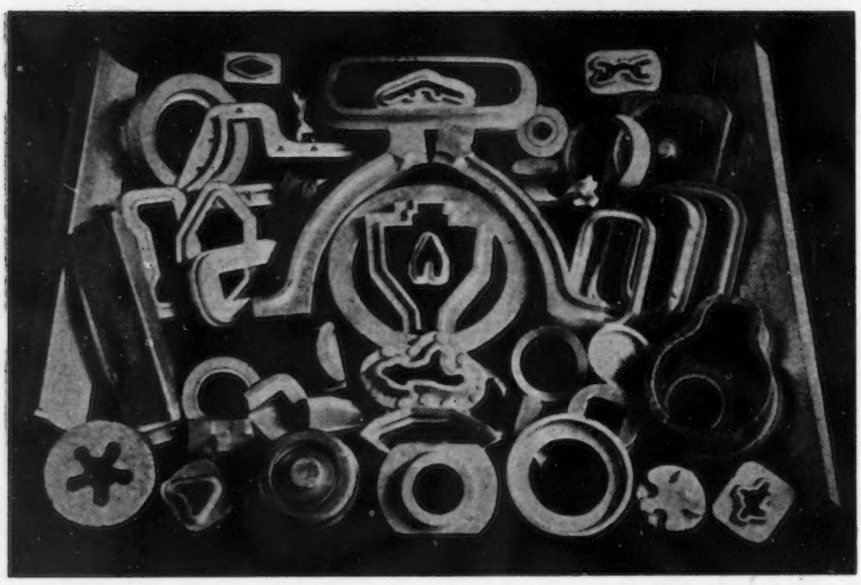
1260 **Tons,** Terre Haute, Ind., Penitentiary, to Laclede Steel Co.

575 **Tons,** St. Joseph, Mo. post office, to Sheffield Steel Corp., Kansas City, Mo.; through A. Farnell Blair Co., contractor.

450 **Tons,** Decatur, Ill., county building, to Truscon Steel Co., Youngstown; through J. L. Simmons, Inc., contractor.

450 **Tons,** Lafayette, Ind., men's dormitory, Purdue University, to Hugh J. Baker Co.; through George A. Fuller.

HAVE YOUR DIES CAST TO SHAPE



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1. **REAL Alloys—refined in electric furnace under closest laboratory control**
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3. **LESS Cost—economical machining (only ⅛" off any surface) and longer life**
4. **BEST All-around Die Steels—for blanking, drawing, forming, swaging, slitting cutters, bakelite dies, etc.**
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FERNDALE (DETROIT) MICHIGAN

COMPOSITE STEEL DIES · TOOL STEEL CAST TO SHAPE
TOOL AND ALLOY STEEL FORGINGS · NITRI-CAST-IRON

433 **Tons,** Huntington, W. Va., United States Engineer, to West Virginia Rail Co., Huntington.

360 **Tons,** New Castle, Ind., sewage disposal plant, to Inland Steel Co., Chicago, through Theodore Bushing, contractor.

240 **Tons,** Chicago, telephone building, to Truscon Steel Co.

220 **Tons,** Lawrenceburg, Ind., bridge, to Laclede Steel Co., St. Louis; through A. G. Ryan & Son, contractors.

200 **Tons,** Green Bay, Wis., Washington Junior High School, to Truscon Steel Co., Youngstown; through Maurice Schumacher, contractor.

200 **Tons,** Marked Tree, Ark., St. Francis drainage project, to Laclede Steel Co., St. Louis; through List & Weatherly, Kansas City, Mo., contractors.

174 **Tons,** Oakland, Cal., Fremont High School gymnasium, to Herrick Iron Works, Oakland; through Carl Swenson, San Jose, contractor.

150 **Tons,** Detroit, surge basin, to Concrete Steel Fireproofing Co.; through Ralph Hidey, contractor.

140 **Tons,** Lake Villa, Ill., route No. 6, to Truscon Steel Co.; through Kapschull Construction Co., contractor.

130 **Tons,** Waukegan, Ill., Lake County Tuberculosis Sanitarium, to Truscon Steel Co.; through Charles B. Johnson, contractor.

123 **Tons,** Mare Island, Cal., transmitting station, to Ceco Steel Products Co., San Francisco; through George J. Maurer, Piedmont, Cal., contractor.

121 **Tons,** Redwood City, Cal., city hall and library, to Gunn-Carle & Co., San Francisco.

110 **Tons,** El Cerrito, Cal., high school shop, to W. C. Hauck & Co., San Francisco.

100 **Tons,** Hillsdale, Mich., hospital, to Bethlehem Steel Co., Bethlehem, Pa.; through Strom Construction Co., contractor.

NEW REINFORCING BAR PROJECTS

NORTH ATLANTIC STATES

2500 **Tons,** Brooklyn, approach, Meeker Avenue bridge, Reiss & Weinser, Inc., Brooklyn, low bidder.

1000 **Tons,** Cape May, N. J., bridges.

790 **Tons,** Danbury, Conn., Federal jail; Edmund J. Rappoli Co., Inc., Cambridge, Mass., contractor.

500 **Tons,** Rumson, N. J., bridge.

300 **Tons,** Washington, N. E. boundary sewer.

250 **Tons,** New Rochelle, N. Y., barracks, Fort Slocum, S. L. Lustbader, Inc., New York, low bidder.

180 **Tons,** Paterson, N. J., school.

150 **Tons,** Rocky Hill, Conn., Soldiers Home and tunnel.

CENTRAL AND WESTERN STATES

1000 **Tons,** Louisville, Ky., housing project; Rommel & Wittenberg, Louisville, Ky., general contractors.

475 **Tons,** Saginaw, Mich., Arthur Hill High School.

300 **Tons,** Anderson, Ind., sewage treatment plant.

300 Tons, State of Oklahoma, eight highway bridges; bids due Dec. 9.

250 Tons, Fort Thomas, Ky., barracks; Great Lakes Construction Co., Chicago, general contractor.

240 Tons, New Albany, Ind., tuberculosis hospital.

207 Tons, Norco, Cal., highway bridge; bids Dec. 15.

200 Tons, Mare Island, Cal., shop foundations; bids Dec. 7.

193 Tons, Alameda, Cal., Navy shop foundations; bids in.

118 Tons, Blaisdell, Ariz., Gila project (Invitation 24677-A); bids in.

115 Tons, Lexington, Va., library building, Virginia Military Institute.

110 Tons, White Fish Bay, Wis., school building.

105 Tons, Oakdale, Cal., grammar school; bids in.

Unstated tonnage, Youngstown, Ohio, Westlake Housing project; Youngstown Builders' Syndicate, low bidder.

. GREAT BRITAIN .

. . . *Price reductions for export trade considered improbable.*

LONDON, Nov. 29.—The Continental steel position is weakening with a decreasing demand, and delivery delays are now only four and five weeks. Prices generally are being maintained, but shapes for Venezuela have been reduced to £4, 6s., gold.

International steel and rail cartels will meet in Paris on Dec. 12 and 13. Price reductions are considered improbable. The Wire Cartel has arranged with American exporters for increased prices in certain markets. Confidence in the Mediterranean wire market has been established by Italy joining the Wire Cartel.

Confidence is still expressed that with the turn of the year British industrial activity will increase, but uncertainty regarding new prices is retarding business, and 1939 orders are in abeyance.

Pig iron consumers are still absorbing supplies under running contracts, and are only making small replacements. Export pig iron sales are restricted by noncompetitive prices.

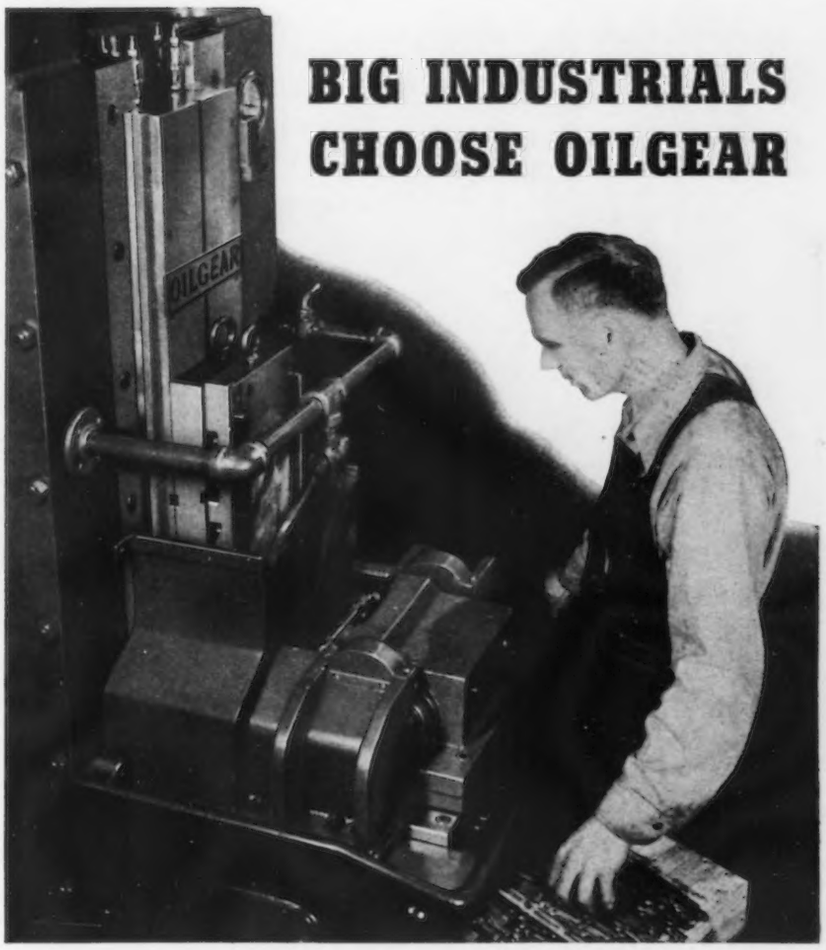
Steel outputs are increasing, though no more plants as yet have been restarted. Big tonnage outputs are envisaged when orders are released for armament factory extensions and for aerodrome equipment.

The United Steel companies and John Summers & Sons are entering conversations which may lead to a merger.

Tin plate demand has been retarded by the delay in announcement of 1939 tin plate bar prices. Meantime, there are moderate sales for early and nearby dates.

November Ore Shipments Above Those of 1937

SHIPMENTS of Lake Superior iron ore from upper lake ports during November totaled 1,481,305 gross tons bringing the total season shipments to 19,263,011 gross tons, according to the final report of the Lake Superior Iron Ore Association issued Tuesday. November shipments last year totaled 1,424,679 tons.



BIG INDUSTRIALS CHOOSE OILGEAR

● Rightly, production executives turn with interest to machines and methods used in the greater industrial plants of America. Here are facilities for investigation of the *value* of machines not possessed by smaller plants.

Rightly, production executives turn to Oilgear Broaches, Presses, Machine Tool Feeds and so on . . . . for Oilgear is the tested and proven choice of great leaders where a *better product,* a *better production means,* a *better story* of *costs cut, and wastes eliminated,* are wanted.

There are certain tests you can make . . . . but both test and testimony will lead *you, too,* back to Oilgear as the utmost in Fluid Power Machines for Industry. THE OILGEAR COMPANY, 1303 W. Bruce Street, Milwaukee, Wisconsin.

OILGEAR

BROACHING MACHINES AND PRESSES

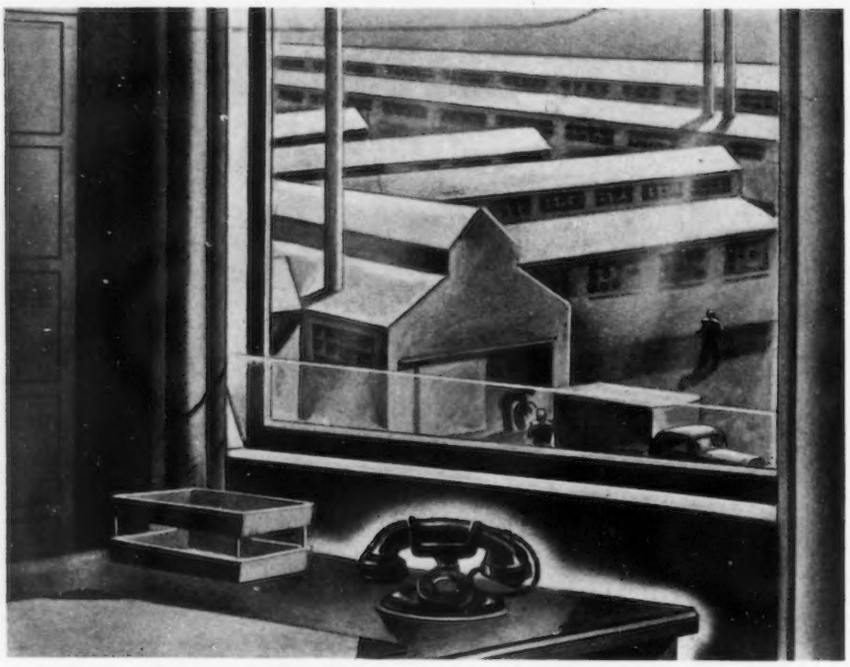
Continental Steel Asks 55c. Wage, Cites Price Changes

WASHINGTON.—Continental Steel Corp., of Kokomo, Ind., told the Public Contracts Board last week that the proposal to fix a minimum wage of 62½c. an hour for employees in the steel industry constitutes "a serious threat" to the successful operation of small companies. A minimum wage of 55c. was asked for small Northern inland mills.

In a brief filed with the board, the company said it employed from 3000 to 4000 workers at an average hourly wage of 86.8c. with a minimum rate of 55c. an hour and that it had operated for the past two years without difficulty under an SWOC contract. Protesting against the board's proposal, the brief explained that larger companies are given a considerable edge because of larger facilities, location and other reasons, and that the minimum wage recommended would tend to enhance their favorable positions. The brief added: "Having a limited number of manufacturing locations (only one for rod and wire products) we have suffered a greatly increased penalty because of recent basing point changes since our business accepted for delivery beyond a small radius requires the absorption of heavy transportation costs.

"Plants so located that adequate nearby consuming markets are not available must reach out to more distant markets and so are compelled to absorb these higher transportation costs and to penalize them further by added burdens of competitive disadvantage would be very disastrous and tend more and more to concentrate the steel business in a few great companies."

The Continental Steel brief was the second to be filled with the board since the wage recommendation was announced Nov. 5. Board members expect the bulk of protests to be filed at or near the deadline date which has been fixed at Dec. 10.



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Thomas executive and general sales offices are located next door to the mill. This provides the opportunity for a complete discussion of each and every specification with the operating department. Aware of this fact, our customers in emergency contact us directly at the mill, and invariably they receive immediate information, which under any other arrangement might take several days to obtain. This unusual service permits you to maintain a more efficient production schedule.

Thomas specializes in meeting your cold rolled strip requirements to the letter. In addition to producing bright cold strip, Thomas makes electro coated finished in copper, brass, bronze, zinc, and nickel. Send for samples or have the Thomas representative call and find out how this teamwork between the mill, our office, and you is to your advantage.

Zinc Coated · Nickel Coated Copper Coated · Brass Coated · Bronze Coated · Bright Finish Uncoated

THE THOMAS STEEL COMPANY • Warren, Ohio
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

. . . CANADA . . .

. . . *Larger steel production expected in 1939*

TORONTO, Nov. 30.—While business in the Canadian iron and steel markets has not reached the high level expected, local interests state that prospects are favorable for increased demand and higher operating schedules in the coming year. Reasons given for the retarded improvement in steel operations this fall are that the British interests have not been taking deliveries against contract on the anticipated basis, but neither have contracts been canceled, and large shipments are expected to start in the new year. The automotive industry was late in getting under way on new 1939 car models, but is now in production. This will create heavy buying of iron and steel materials and orders already are beginning to appear. Building trades are showing general improvement.

Steel interests predict that 1939 will be one of the record years in production, and some state that 1938 production and earnings will be only slightly under the 1937 level.

A REVOLUTIONARY STEEL BAR DEVELOPMENT BY LA SALLE

STRESSPROOF *No. 2*

High Strength—Minimum yield point: 100,000 lbs. per sq. in. Has been successfully substituted for heat treated alloy and carbon bars in many applications.

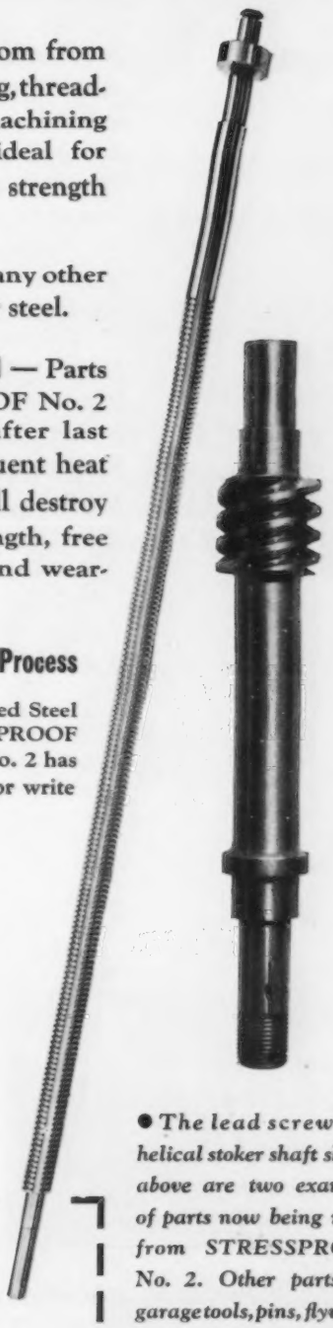
Free Machinability—Machines approximately 80% of Bessemer Screw Steel. Users report cutting speeds in excess of 165 surface feet per minute.

Unique Wearability — Users replacing steels "treated" to approximately 300 Brinell and in some special applications, even case hardened steels, with STRESSPROOF No. 2, machined and used as received, report complete satisfaction with its wear performance.

No Warpage—Complete freedom from warpage after keyseating, splining, threading, step-down and similar machining operations makes this steel ideal for machine tool parts and high strength shafting requirements.

Low Cost—Priced lower than any other high strength cold finished bar steel.

No Heat Treatment Required — Parts machined from STRESSPROOF No. 2 bars are ready for service after last machining operation. Subsequent heat treating is unnecessary and will destroy the combination of high strength, free machinability, non-warpage, and wearability found in the steel.



● *The lead screw and helical stoker shaft shown above are two examples of parts now being made from* STRESSPROOF *No. 2. Other parts are garage tools, pins, flywheel bolts, spline torsion shafts, wringer gears, stoker worms, and many others.*

STRESSPROOF No. 2 Is Produced By La Salle's Exclusive STRESSPROOFING Process

T. M. Reg. U. S. Pat. Off.

The unusual combination of properties inherent in STRESSPROOF No. 2 Cold Finished Steel Bars are obtained only through the La Salle STRESSPROOFING process. Other STRESSPROOF steels can be and have been produced by La Salle by this process but STRESSPROOF No. 2 has been found to be the most applicable in the great majority of cases. Return the coupon or write for descriptive booklet. La Salle Steel Company, Box 6800-A, Dept. 12D, Chicago.

La Salle

STEEL COMPANY

Producers of the Most Complete Line of Cold Finished Steel Bars in America.

WRITE FOR FREE BOOK

LA SALLE STEEL COMPANY
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Please send me booklet describing your new steel STRESSPROOF No. 2.

Name_____ Title_____

Firm_____ Address_____

Also send to _____

PWA Steel Tops Other Materials

WASHINGTON.—The value of iron and steel products used on six different classifications of PWA projects was greater than the value of any other single material listed, according to a study completed by PWA.

For every $1,000,000 of expenditures, iron and steel products used in residential building construction were valued at $72,200 out of a total of $457,000 for all materials; in non-residential building construction $150,000 out of a total of $541,000; on sewage disposal systems, $146,000 out of a total of $509,000; on water supply systems, $375,800 out of a total of $604,000; on street and road projects $122,000 out of a total of $482,000; and on reclamation projects, $108,000 out of a total of $480,000.

On PWA steam power and light plant construction, the value of iron and steel products was estimated by the agency at $56,600 for every $1,000,000 of expenditures. The value of electrical machinery was listed at $416,600 and foundry and machine shop products at $156,600.

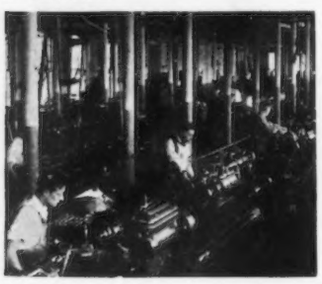
On diesel power and light plants, the value of iron and steel products, listed at $35,500 came third, with $331,400 given as the value of electrical machinery and $322,500 for diesel engines.

You CAN HAVE ANY PART OR PRODUCT **ENGINEERED...TOOLED UP...** AND **MANUFACTURED** BY

Engineering: *Experienced tool and machine design, mechanical audit. Unique facilities for confidential work.*

Tooling: *World's most famous toolroom serves many leading manufacturers in special tooling, model building, development work.*

Manufacturing: *6 departments . . . over 200,000 sq. ft. No job too large or too small.*



At your disposal here are more than 1,000 modern machine tools, more than 200,000 square feet of floor space. And here you can obtain a single part or quantity production . . . made *as* you want it, *when* you want it . . . at a cost kept down by overhead-spread.

Taft-Peirce Contract Service includes all the facilities of your own plant . . . engineering, tooling, manufacturing, heat treating, inspection, assembly, shipment. You can even have your own department production line, where quantities warrant. *No job is too large, none too small.* For full details, write The Taft-Peirce Mfg. Co., Woonsocket, Rhode Island.

for complete, prompt, dependable contract service

"TAKE IT TO TAFT-PEIRCE"

. . . OBITUARY . . .

B. E. V. Luty Dies

JUST as THE IRON AGE went to press word was received of the death of B. E. V. Luty, Pittsburgh editor of the *American Metal Market*. Further details will be published in next week's issue.

❖ ❖ ❖

JOHN M. PATON, assistant to president of American Steel & Wire Co., Cleveland, and widely known throughout the steel industry, died of a heart attack, Nov. 29, at Lakeside Hospital, Cleveland. He was 69. Mr. Paton had been an employee of the company for 45 years and had been a member of the president's staff since 1936. For 18 years he was traveling auditor for the firm.

❖ ❖ ❖

FRED D. JONES, an early associate of James A. Campbell, during the growth of the Youngstown Sheet & Tube Co., died at his home in Youngstown, Nov. 26, following a heart attack. Mr. Jones was 69. During the early days of Youngstown Sheet & Tube Co. and until his retirement in 1922 he had charge of purchasing raw materials for the company.

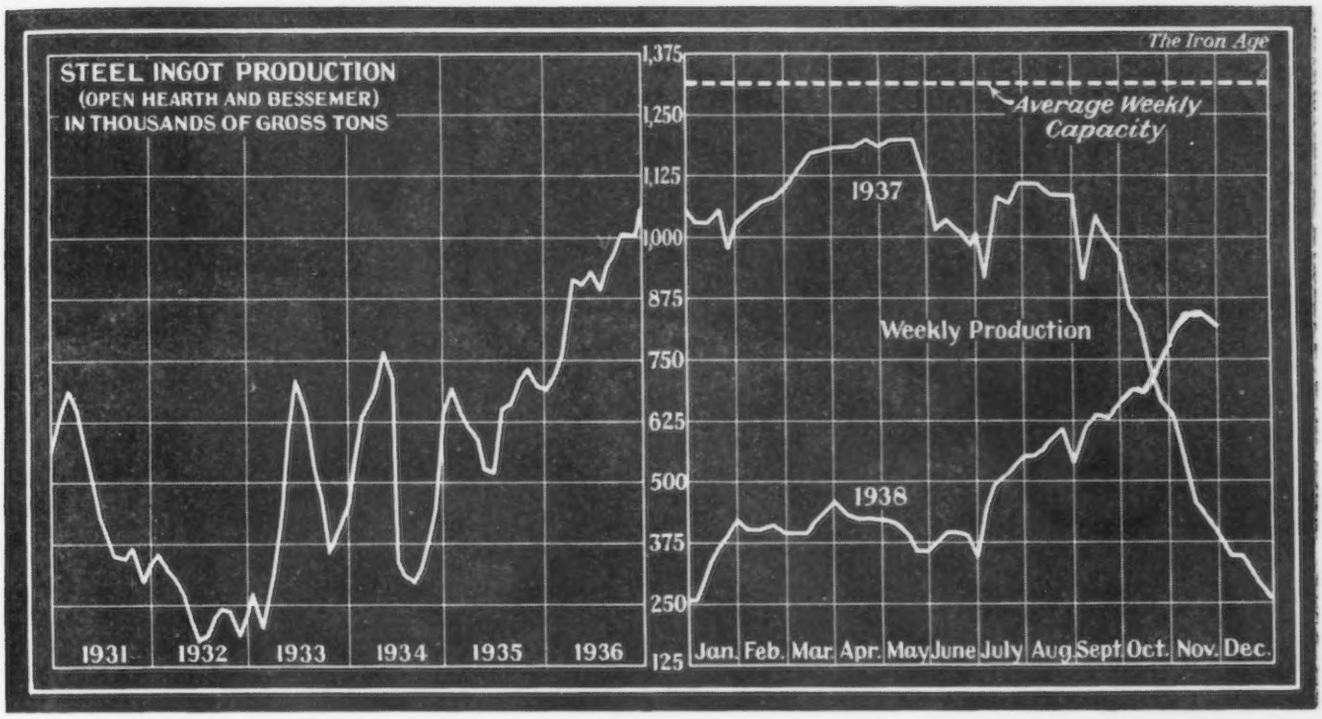
❖ ❖ ❖

ARTHUR S. HUGHES, president and founder of the Hughes Keenan Structural Iron Co., Mansfield, Ohio, died Nov. 27, at the age of 60, following a heart attack.

New Form of Colloidal Graphite Being Introduced

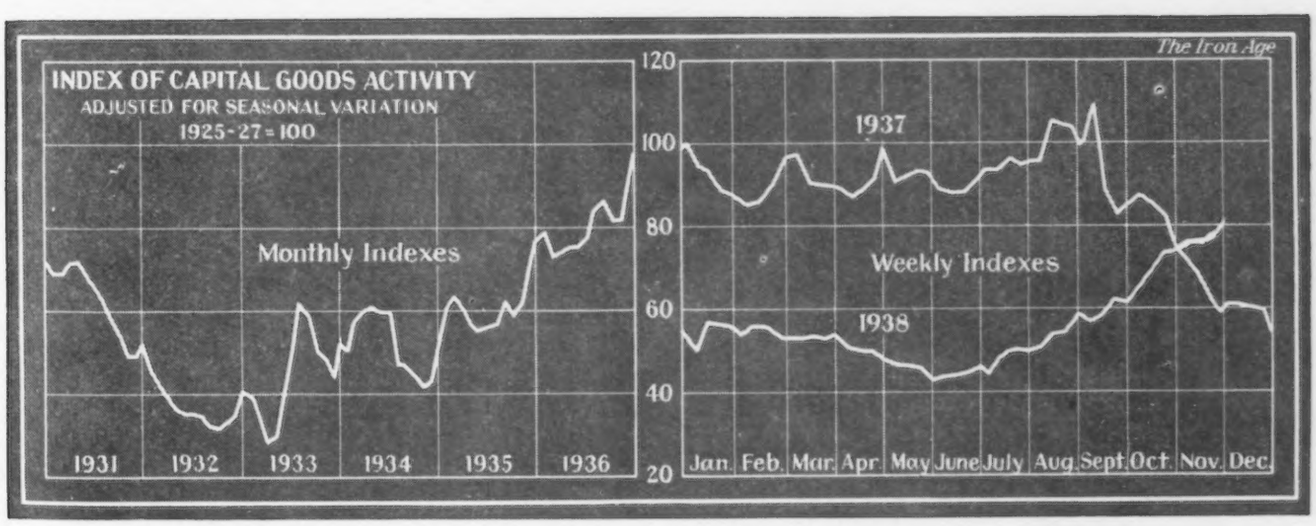
HOWARD A. ACHESON, president, Acheson Colloids Corp., returned from Europe last week. Mr. Acheson visited the company's British affiliate, E. G. Acheson, Ltd., in connection with the forthcoming introduction abroad of the new form of "dag" colloidal graphite. The new product, now being introduced to manufacturers, is so finely divided, it is understood, that it may be suspended in such low viscosity and volatile liquids as carbon tetrachloride and kerosene.

Ingot Output Down Another Point to 60.5 Per Cent



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Wheel-ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	47.0	56.5	61.0	37.0	68.0	81.0	52.5	87.5	60.0	64.0	40.0	59.0	75.0	60.5
PREVIOUS WEEK..	48.0	58.5	63.0	37.0	74.0	83.0	49.0	85.5	60.4	64.0	40.0	56.2	75.0	61.5

Capital Goods Output Continues to Gain; Index at 80.4



THE rate of production and distribution of durable goods showed a further rise in the week ended Nov. 26, according to THE IRON AGE capital goods index, despite the holiday which normally has a pronounced effect on the output of the heavy industries. The week's improvement raised the index 3.5 per cent to 80.4, the highest since the week of Oct. 30, 1937. For the second consecutive week all the components of the index shared in the gain, with the automobile and the steel production series recording the largest advances. In both these series the gain was due to the fact that the week's small loss in physical output was much less than the seasonal factor which is used in computing the index.

	Week Ended Nov. 26	Week Ended Nov. 19	Comparable Week 1937	Comparable Week 1929
Steel ingot production[1]	95.0	90.4	47.8	99.8
Automobile production[2]	96.9	93.9	70.0	60.6
Construction contracts[3]	80.4	80.0	58.8	108.8
Forest products carloadings[4]	57.5	55.2	54.0	112.9
Production and shipments, Pittsburgh District[5]	72.3	69.2	64.4	104.7
Combined index	**80.4**	**77.7**	**59.0**	**97.4**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Operations off slightly as pressure eases.

o o o

. . . Present prices may be reaffirmed for first quarter.

o o o

. . . Rebates being given to tin plate users.

STEEL operations are lower in some districts, resulting in a one point decline to 60.5 per cent for the industry as a whole, mainly because of a lessening of the pressure for deliveries to the automobile manufacturers, but partly due to lighter orders from users in general as year-end inventory time approaches.

The slightly easier situation has brought a drop of 50c. a ton in the price of steel scrap at Chicago, with a conflicting upward movement of 25c. at Pittsburgh, the net result being a decrease of 8c. in THE IRON AGE scrap composite price to $14.92.

Although prospects are accumulating that point to a further upward trend in steel buying, not much change may develop until after the first of the year unless there should be a price advance for the first quarter, an unlikely possibility. Price announcements, which are expected this week or next, probably will reaffirm present quotations on steel and pig iron.

An unprecedented price situation is a retroactive reduction on tin plate covering the period from Jan. 1 to Nov. 10, 1938, whereby adjustments are being made to $5.10 per base box, the difference between that figure and the official price of $5.35 that was in effect being refunded to tin plate users. It is estimated that refunds will total close to $5,000,000. This action is a belated result of a letter which the American Can Co. sent to its customers last April, pointing to price concessions.

AMONG the new prospects the most unexpected are sizable inquiries and orders from some of the railroads for equipment and track materials. The Norfolk & Western has come into the market for 2100 freight cars, the Illinois Central has ordered 1000 and is considering an additional 1000, and the Bessemer & Lake Erie has ordered 200. The first orders of the annual rail buying movement are 17,280 tons from the Louisville & Nashville and 2600 tons from the Nashville, Chattanooga & St. Louis, both placed with the Alabama mill, which resumed operations Nov. 28 for what may be an extended run as other orders are in prospect. Northern and Western roads are expected to come into the market soon, but perhaps for limited quantities.

Though fabricated structural steel lettings at the moment are rather light, amounting to only a little over 15,000 tons in the week, inquiries are expanding, totaling about 81,800 tons, which includes 16,500 tons for the Criminal Courts building, New York, and 15,000 tons for a bridge across Narragansett Bay, Rhode Island. Revised estimates of the steel required for the Chicago subway total 84,900 tons. Bids on the first section will be taken Dec. 1 and on other sections during December, January and February.

Shipbuilding requirements are also expanding, the Sun Shipbuilding & Dry Dock Co. having been awarded four cargo boats which will take 17,480 tons of steel.

While there has been no rush of tin plate buying following the recent reduction in price, some orders for new rollings have been received by the mills and a heavy demand is expected to develop in the first quarter.

The automobile industry is expected to make further large purchases before the end of December as its plans for continued high production extend at least through January. This week's assemblies may reach 100,000 cars, which would be the high mark for the year thus far. Ford Motor Co. is stepping up production to 4000 cars a day as rapidly as possible and has increased steel output.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham.	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...

Cents Per Lb.:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.35	$5.35

*Pittsburgh prices only.

Pig Iron

Per Gross Ton:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.76
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.26
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Heavy melting steel, P'gh.	**$15.75**	$15.50	$14.75	$13.25
Heavy melting steel, Phila.	14.75	14.75	14.75	13.75
Heavy melting steel, Ch'go.	*14.25*	14.75	13.75	11.75
Carwheels, Chicago	*12.75*	13.00	13.75	14.50
Carwheels, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	16.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	*12.50*	12.75	12.25	11.50

Coke, Connellsville

Per Net Ton at Oven:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.25
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, *1937
Electrolytic copper, Conn.	11.25	11.25	11.25	10.75
Lake copper, New York	11.375	11.375	11.375	11.125
Tin (Straits), New York	*45.90*	46.00	46.50	42.50
Zinc, East St. Louis	*4.50*	4.75	5.05	5.25
Zinc, New York	5.14	5.14	5.44	5.60
Lead, St. Louis	*4.85*	4.95	4.95	4.85
Lead, New York	5.10	5.10	5.10	5.00
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.75

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
November 29, 1938	2.286 a Lb.	$20.61 a Gross Ton	$14.92 a Gross Ton
One week ago	2.286	20.61	15.00
One month ago	2.286	20.61	14.42
One year ago	2.512c.	23.25	12.92

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29
1928	2.192c., Dec. 11	2.142c., July 10
1927	2.402c., Jan. 4	2.212c., Nov. 1

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1938	$23.25, June 21	$19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.73, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24
1927	19.71, Jan. 4	17.54, Nov. 1

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1938	$15.00, Nov. 22	$11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 16
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 23
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 2
1927	15.25, Jan. 17	13.08, Nov. 22

. . THIS WEEK'S MARKET NEWS . .

STEEL OPERATIONS

. . . Declines in several districts reduce average to 60.5%

STEEL ingot production for the industry as a whole has declined one point from last week to 60.5 per cent, a drop of two points within two weeks. The estimate of the American Iron and Steel Institute issued on Monday predicted a rate of 60.7 per cent this week.

Operations are lower in several important districts. The decline at PITTSBURGH is one point to 47 per cent; in the WHEELING-WEIRTON district two points down to 81 per cent; at CHICAGO, two points lower at 56.5 per cent; YOUNGSTOWN is two points down at 61 per cent; CLEVELAND-LORAIN, six points lower at 68 per cent.

Production is slightly higher at BUFFALO and DETROIT. At the latter point ingot production jumped two points to 87.5 per cent owing to an increase in the number of active open hearths at the Ford Motor Co. plant. Ford is now operating six furnaces, or 58 per cent of its capacity, a rate that may be maintained for some months. At BUFFALO the Bethlehem Steel Co. has put on two more open hearths.

The Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. resumed operations Nov. 28 for what is hoped will be a long run now that the rail buying season has opened.

NEW BUSINESS

. . . Tapering off in orders seen in some areas

FINISHED steel demand at PITTSBURGH is a shade less active than a week ago. A slower buying pace is probably attributable to proximity of inventory taking period. Producers expect no important increase or decrease in demand during the remainder of the year but are mildly optimistic for the first quarter because of anticipated tin plate releases and a pickup in structural steel demand.

The scarcity of demand in OHIO at present is customary toward the close of the year because of the State inventory tax. The automotive industry is yielding fill-in orders for CLEVELAND and YOUNGSTOWN producers, while can makers and farm implement manufacturers are more active, but construction requirements have tapered owing to the weather.

Rail buying is expected before long, as usual at this time of year.

Apparently October will stand out as the best month of 1938 for buying.

Shipments of sheets and strip continue heavy, and November deliveries of OHIO pig iron producers are exceeding all previous months this year.

At CHICAGO orders appear to be lighter and the old policy of buying for current needs is still in force. The belief that additional sheets and strip will be placed in December for motor cars still holds. Current flat rolled bookings, however, are unimpressive. A possible reason for lower operations in the CHICAGO district is that auto specifications have been so heavy that backlogs of certain sizes have been depleted. Deliveries are being quoted on most grades of sheets after Jan. 1, nevertheless.

Bids are being taken Dec. 1 on the 3900 tons of reinforcing bars, 3200 tons of liner plates and rib beams, and 700 tons of structural shapes in the first section of the CHICAGO subway. Revised estimates indicate 25,000 tons of liner plates and rib beams, 31,000 tons of shapes, 19,500 tons of reinforcing and 9400 tons of piling will be required, a total of 84,900 tons. Bids on the second section may be taken by Dec. 30, and the remaining eight tunnel sections will be open for bids at intervals of about three weeks. At some time all 10 tunnel sections will be under construction simultaneously.

An additional 1000 freight cars have been placed with American Car & Foundry Co. by the Illinois Central. Bessemer & Lake Erie placed 100 flat cars with the same builder and ordered 100 gondolas from another car company.

Shadows of the inventory period hovered over the CINCINNATI area the past week, when bookings eased to about 50 per cent of capacity. Sellers indicated no reduction in consumer interest, but felt the usual conservatism preceding inventories had prompted users to confine specifications to needs.

While sentiment in the ST. LOUIS area is reported to be better, buying continues light, the trade being inclined to hold off commitments except for immediate needs until after first quarter prices are announced.

The steel market is quieter at BUFFALO.

In the SOUTH the volume of new tonnage continues satisfactory. Sheet demand is very active and the Fairfield sheet mill of the Tennessee Coal, Iron & Railroad Co. is close to capacity operations. Inquiries are numerous for structurals and concrete reinforcing bars, and a large amount of new tonnage is in early prospect.

In NEW YORK the volume of new orders has held up fairly well, but no further gains are being made.

PRICES

. . . Present quotations may be reaffirmed

FIRST quarter price announcements are looked for this week or next with possibility of higher prices becoming increasingly remote. A substantial test of flat rolled prices is expected when automotive companies come into the market for early 1939 steel. Prices on major steel products are holding firm with the usual irregularities present on concrete bars, wire nails, and to some extent galvanized roofing products.

Revision of size and gage extras on wire nails is looked for.

Pig iron producers who announced higher prices for the fourth quarter are likely to reaffirm these prices for first quarter, if steel producers reaffirm.

A retroactive reduction of tin plate prices covering the period from Jan. 1 to Nov. 10, 1938, has been made by leading producers. For details see heading "Tin Plate."

PIG IRON

. . . Shipments in November moderately improved . . . No price change expected

SHIPMENTS of merchant pig iron in November were moderately better than those of October in some districts, but this situation did not hold throughout the country.

At CHICAGO shipments were 11 per cent ahead of October's, and foundry coke ran almost 10 per cent better. Shipments of CLEVELAND producers were about 5 per cent ahead of October's. Releases at PITTSBURGH are not expanding; on the contrary, some foundry operations have been adversely affected by seasonal influences. ST. LOUIS shipments in November were slightly above those of October. In Eastern markets, including NEW ENGLAND, the situation is little, if any, better than in October.

New business in all districts is almost at the vanishing point. Not much change in this situation is expected until after the turn of the year. If steel prices are reaffirmed for the first quarter, as appears to be likely, pig iron probably will be unchanged also. In this event some of the iron contracted for prior to the $1 advance may not be shipped until early in the first quarter.

Foreign inquiry includes 2000 tons of low phosphorus and foundry grades mixed and 1000 tons of foundry iron for Europe.

Imported ferromanganese, mostly from Germany, is being offered on the Atlantic Seaboard at prices amounting to as much as $20 a ton below domestic prices.

PLATES

. . . Steel bought for 1000 Illinois Central cars

PLATES for freight cars are the only immediate bright spot in a dull market. Orders are understood to have been placed for the material required for 1000 freight cars which the American Car & Foundry Co. will build on a lease-purchase basis for the Illinois Central Railroad. A substantial tonnage also will be required for 2100 freight cars for which the Norfolk & Western is inquiring.

About 2500 tons of plates will be used if steel pipe is chosen for 7.2 miles of the Los ANGELES Metropolitan Water District aqueduct laterals; if the concrete alternate is selected, a sizable quantity of reinforcing bars will be needed. Bids go in Dec. 12.

Plate bookings for some mills were lighter in November than in October. Although shipbuilding requirements have been accumulating, much of the tonnage required will not be rolled in the immediate future. The outlook for the plate trade may not improve much until railroads come into the market for new equipment in larger volume.

Market Sidelights

Awarded contracts to supply all Federal Government departments with steel files and desks during 1939, General Fireproofing Co., Youngstown, plans to provide additional employment after Jan. 1. The award by the Procurement Division of the Treasury Department means between $500,000 to $1,000,000 worth of additional business next year for the company which already has a contract to supply aluminum chairs for the Government.

Truscon Steel Co. was low bidder recently on a Government contract for large hangar doors for airports.

* * *

Bureau of Supplies and Accounts, Navy Department, will open bids Dec. 13 for 1000 tons of black and galvanized medium steel angles for the battleships North Carolina and Washington building at the Brooklyn and Philadelphia Navy yards, respectively.

* * *

Cincinnati Milling Machine Co., Cincinnati, Ohio, will increase its foundry by 400,000 sq. ft. The addition will be made in units, the first of which will be 100,000 sq. ft.

* * *

Detroit Steel Products Co., Detroit, will furnish 65,800 steel windows for the Metropolitan Life Insurance Co.'s 12,000-family housing project in the Bronx, New York. Windows and casings will total about 2800 tons. The order is said to be the largest ever placed for steel windows.

* * *

Confidence that business generally is headed for improvement has brought an influx of orders to the Austin Co., Cleveland, for industrial buildings, according to George A. Bryant, Jr., vice-president of the company, who reports that more than a score of contracts ranging from $50,000 to $1,000,000 have been signed within the past two months.

* * *

On Dec. 1, the Tennessee Coal, Iron & R.R. Co. will start night shifts at its Wylam and Docena coal mines. About 200 additional men will be put back to work at each mine. Night-shift operations at the Wylam mine have been suspended since Jan. 29, 1938, and at the Docena mine since May 2, 1938.

* * *

County Commission of Jefferson County, at Birmingham, Ala., is preparing to construct a new 14-story minimum-charge county hospital at a cost of approximately $1,660,000. It is a PWA project.

SEMI-FINISHED STEEL

. . . Sheet bar movement is fairly brisk

BOOKINGS at PITTSBURGH continue to hold up fairly well and the past week's tonnage showed little or no change. Sheet bar movement is fairly brisk to non-integrated mills. Tin bar business is expected to materialize in the near future.

At CLEVELAND and YOUNGSTOWN, sales of semi-finished for November show a decline as compared with October.

STRUCTURAL STEEL

. . . Awards drop, pending awards in New York area 39,000 tons

PENDING tonnages, particularly in the EAST, are fairly heavy but awards for the week in most areas are sharply lower. The general contract on the Tacoma, Wash., Narrows Bridge, 17,000 tons, has been given to Pacific Bridge Co., SAN FRANCISCO.

Jobs in prospect in the EAST include 18,000 tons for the superstructure of the Meeker Avenue bridge in Brooklyn, on which American Bridge Co. is low bidder, 16,500 tons for the Criminal Courts building in NEW YORK, 3500 tons for two bridges in NEW JERSEY and 1000 tons for the Family Court building in NEW YORK.

A bridge across Narragansett Bay, Rhode Island, will require 15,000 tons.

Specifications to the mills at PITTSBURGH show little change, but producers look for considerable tonnage after Jan. 1. American Bridge Co. will furnish about 900 tons of material for a bridge at Roswell, N. M. No large shape contracts were placed in the CHICAGO area last week but some substantial jobs are likely to be awarded shortly. Pending projects in the ST. LOUIS area include 2780 tons for Oklahoma highway bridges and 1200 tons for a Kansas City (Mo.) viaduct. Approximately 4800 tons of structural steel will be required for the Navy shop building at Alameda, Cal., on which bids will be taken Dec. 21. Bethlehem Steel Co. has been awarded a 3000-ton Navy contract for an extension crane runway and structural shop at Portsmouth, Va.

The only new job in the PHILADELPHIA area involves about 2000 tons of shapes for four bascule toll bridges at Cape May, N. J. (general contract

bids due Dec. 15). The structural steel fabricating industry reports October bookings at the highest level in 12 months (137,642 tons against 62,267 tons in October, 1937).

(Details of fabricated steel awards and contracts will be found on page 96.)

WIRE PRODUCTS

. . . Higher extras on nails may be adopted

AN independent producer of merchant wire products is expected to announce wire nail extra revisions some time this week. New extras have been worked up on the basis of current costs which are somewhat different than in 1927 when the last major revision was made. Wire staples which heretofore had a base of their own, will probably be taken care of by an extra to be added to the wire nail base.

Total wire sales at PITTSBURGH during the past week were off slightly due in a large part to the drop in merchant wire demand. Wire prices to jobbers continue soft in the EAST.

Final November reports at CLEVELAND are expected to be good in comparison to October, which was one of the best months of the year. Incoming orders for rods and manufacturers' wire have slackened recently. Orders for merchant products have slumped, due to the arrival of winter. The competitive situation on nails, which has been in effect for approximately 90 days, particularly in the CHICAGO and NEW ENGLAND territories, shows a little change for the better. In other parts of the country prices are firm, especially in the Northwest.

December sales in the CHICAGO area are expected to continue at present levels, influenced mostly by activity in Detroit. Optimism is being expressed by wire sellers for 1939 prospects.

SHEETS AND STRIP

. . . Production holds, orders are more diversified

ORDERS during the past week have shown greater diversification at several leading centers, although some points, such as PITTSBURGH, find new business coming in rather slowly. Approach of the inventory period is a factor in ordering. Production continues fairly heavy.

At CLEVELAND, YOUNGSTOWN and other OHIO centers, capacity is comfortably scheduled, particularly on the cold mill side. Requirements of the automobile industry remain better than expected and are resulting in additional fill-in specifications for this quarter, but demand from other sources is very light. Orders for galvanized sheets have tapered sharply.

Sheet sellers in the NEW YORK district are encouraged by the small but steady volume of new orders for all sheet classifications coming in from fabricators and jobbers heretofore considered to have covered all their requirements during the price dip. Advance in shipping date on the low-priced material is being requested by an appreciable number of buyers, indicating acceleration in consumption and tending to relieve the year-end congestion. Mills are still adhering to the warning of cancellation of all unspecified tonnages on contract after Dec. 31.

The sheet and tin mills at one large plant in CHICAGO are scheduled to operate during the coming week at over 90 per cent of capacity. Next year delivery is being quoted in that district by most sellers.

At PHILADELPHIA miscellaneous ordering has shown a tendency to fall off, and even further constriction in demand is expected. Autobody stamping plants are taking the bulk of sheets coming into this territory and are currently operating practically at peak capacity.

RAILROAD BUYING

. . . Norfolk & Western inquires for 2100 cars . . . Illinois Central orders 1000

ALTHOUGH not much had been expected from the railroads until the Washington Administration worked out a plan of Government aid, there has been a moderate degree of activity in equipment and rails. The Norfolk & Western has issued an inquiry for 1500 hopper cars and 600 box cars and the Illinois Central has ordered 1000 freight cars from the American Car & Foundry Co., duplicating an order placed early in September. Another thousand cars is said to be under consideration by this road. The Bessemer & Lake Erie has ordered 100 flat cars from the American Car & Foundry Co. and 100 gondolas from an unnamed car company. The Wheeling & Lake Erie has not yet bought the 400 cars inquired for about two weeks ago.

Rail purchases have perked up a bit in the SOUTH. The Louisville & Nashville has ordered 17,280 tons from the Tennessee Coal, Iron & Railroad Co., with an accessory order to follow soon, and the Nashville, Chattanooga & St. Louis has placed 2600 tons of rails and 400 tons of accessories with the same mill. Other rail orders are said to be pending.

Small orders for equipment include one diesel-electric locomotive placed by the Kansas City Terminal with the American Locomotive Co.; 12 dump cars placed by the Kennecott Copper Corp. with the Austin-Western Road Machinery Co. The Temiskaming & Northern Ontario Railroad is taking bids on one rail-motor car.

The a. c. f. Motors Co. has received orders for 17 motor coaches from various cities.

BOLTS, NUTS, RIVETS

. . . Operations continue at about 40%

BOLT and nut makers of PITTSBURGH report little or no change in volume during the past week. Operations continue at about 40 per cent with major support coming from automobile makers.

At CLEVELAND deliveries continue heavy to the automotive industry but buying has become very light. Producers expect impetus may be provided by requirements of the implement industry.

TIN PLATE

. . . Price of $5.10 a base box made retroactive to Jan. 1 . . . Rebates being given

A RETROACTIVE reduction in the price of tin plate to $5.10 a base box covering the period from Jan. 1 to Nov. 10, 1938, has been made by some of the leading tin plate makers and others are expected to follow. Rebates of 25c. a base box, the difference between $5.10 and $5.35, the official price that was in effect during the nine months, have already been paid by some companies in the form of credit memoranda.

Production of tin plate for sale during the first nine months of this year, as reported by the American Iron and Steel Institute, was 900,846 gross tons, exclusive of exports, so that the total amount to be refunded to domestic users will be about $5,000,000.

This action is a belated result of the letter which the American Can Co. sent to its customers last April, in which it was stated that "uncertain and disturbed business conditions have caused a situation in which the official price of tin plate applicable on Jan. 2, 1938, does not now reflect the actual market price of tin plate." After stating that the American Can Co. had been paying the official price of tin plate, but intimating that some of its competitors were obtaining concessions, the letter went on to say that "under present conditions price adjustments on past deliveries and lower prices for future deliveries should be obtainable and our company is taking steps to achieve this result."

This letter created a sensation in the tin plate trade, but no official action was taken to change the price of tin plate until the announcement of the Carnegie-Illinois Steel Corp. of Nov. 10, which reduced the price to $5 a base box, effective through the first quarter of 1939.

Not all of the tin plate makers have made adjustments with their customers, but those who have not done so admit that to remain competitive they will be obliged to take like action.

No major rush of business has developed since the tin plate price announcement. A substantial step up in specifications is expected, however, after the first of the year. Major can companies are holding inventories down until the new year. Consequently requirements probably will be very heavy during the first half of 1939. Operations continue at 30 to 35 per cent.

TUBULAR GOODS

. . . Sales decline, mainly in oil country goods

TUBULAR goods sales volume at PITTSBURGH has receded slightly during the past week owing to a further leveling off in oil-country goods specifications. Other pipe products are as active as a week ago.

Aggregate incoming business for CLEVELAND and YOUNGSTOWN producers during November shows a slight decline from the October level. Standard pipe is less active and casing orders have slowed down. Connecting oil lines are responsible for considerable activity.

SHIPBUILDING

. . . Maritime Commission awards four cargo boats to Sun

THE Maritime Commission on Tuesday awarded a $10,919,200 contract to the Sun Shipbuilding & Dry Dock Co., Chester, Pa., for the construction of four diesel-propelled C-3 steel cargo vessels. The ships will require a total of 17,480 tons of steel.

Bids were opened by the commission on Nov. 25. The Bethlehem Steel Co., New York, and Ingalls Iron Works Co., Inc., Birmingham, were the only two other bidders.

REINFORCING BARS

. . . Laclede Steel Co. awarded 1260 tons for prison

THE largest award of reinforcing bars reported this week is 1260 tons for a penitentiary at Terre Haute, Ind., which Laclede Steel Co. will furnish.

New inquiries include 2500 tons for the Meeker Avenue bridge, Brooklyn; 1000 tons for bridges at Cape May, N. J., and 1000 tons for a housing project at Louisville, Ky.

The volume of small work remains fairly constant in some areas, but much of it is due to the use of public funds.

There has been a stiffening of quotations in some districts.

(Details of reinforcing bar awards and inquiries will be found on page 94.)

MERCHANT BARS

. . . Greater diversification in orders noted

ALTHOUGH total hot rolled bar sales at PITTSBURGH are not much if any greater in volume than a week ago, there is greater diversification. Individual orders continue small. Some activity is reported from refrigerator and farm implement makers.

November orders for bar mill products at CLEVELAND and YOUNGSTOWN increased approximately 10 per cent over the October volume. Principal demand at present is coming from small forgers and implement manufacturers, the latter involving eleventh hour ordering for tilling equipment.

Some implement and tractor tonnage is straggling in to CHICAGO producers, but not until next year is much business expected from this source. Orders generally are falling off slightly as some are said to have accumulated a little stock.

Imports at Philadelphia

PHILADELPHIA.—The following iron and steel imports were received here during the past week: 100 tons of ferromanganese from Norway; 38 tons of steel forgings and four tons of steel tubes from Sweden; and 63 tons of structural shapes from Belgium.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 29, 1938	Nov. 22, 1938	Nov. 1, 1938	Nov. 30, 1937	1938	1937
Fabricated structural steel awards	15,315	16,000	18,400	11,750	818,960	794,635
Fabricated plate awards	510	1,140	710	2,275	119,015	127,240
Steel sheet piling awards	300	890	0	1,200	44,890	58,780
Reinforcing bar awards	6,560	3,200	9,925	950	303,000	257,915
Total Letting of Construction Steel..	22,685	21,230	29,035	16,175	1,285,865	1,438,570

FABRICATED STEEL

. . . Lettings slightly lower at 15,315 tons as against 16,000 tons last week . . . New projects of 81,800 tons double those of a week ago . . . Plate awards call for only 510 tons.

NORTH ATLANTIC STATES

AWARDS

1050 Tons, Long Island City, N. Y., Queens ventilation building, to Ingalls Iron Works Co., Birmingham, through Cauldwell-Wingate Construction Co.

950 Tons, Brooklyn, public school No. 221, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

850 Tons, Jackson Heights, N. Y., Queensboro Housing, to Simon Holland & Son, New York.

830 Tons, Bloomfield, N. J., Junior High School, to F. G. Schaefer Iron Works, Edgewater, N. J.

310 Tons, South Jamaica, N. Y., Green Bus Co. garage, to American Bridge Co., Pittsburgh.

240 Tons, Ford City, Pa., Crooked Creek Dam, to Commercial Shearing & Stamping Co., Youngstown.

200 Tons, Bogota, N. J., railroad grade elimination, to American Bridge Co., Pittsburgh.

187 Tons, New York, Parachuting Tower at World's Fair for International Parachuting, Inc., to Bethlehem Steel Co., Bethlehem, Pa.

130 Tons, Bartlett, N. H., bridge, to American Bridge Co., Pittsburgh.

125 Tons, Princeton, Me., bridge, to American Bridge Co., Pittsburgh; H. L. Goodrich, Palmyra, Me., contractor.

120 Tons, Albany, N. Y., parish house, Dutch Reformed Church, to James McKinney & Son, Albany.

110 Tons, Princeton, Me., bridge, to American Bridge Co., Pittsburgh.

SOUTH AND SOUTHWEST

3000 Tons, Portsmouth, Va., extension crane runway and structural shop at Navy Yard, to Bethlehem Steel Co., Bethlehem, Pa.

875 Tons, Roswell, N. M., State river bridge over Pecos River, to American Bridge Co., Pittsburgh.

600 Tons, Port Royal, S. C., State bridges, to Bethlehem Steel Co., Bethlehem, Pa.

455 Tons, Harrison County, Miss., highway bridge, to Virginia Bridge Co., Roanoke, Va.

155 Tons, Dupont, W. Va., high school, to Ingalls Iron Works Co., Birmingham.

140 Tons, Bristol, Tenn., high school, to Bristol Steel & Iron Co., Bristol.

CENTRAL STATES

400 Tons, Wauwatosa, Wis., fourth unit, Junior-Senior High School, to Worden-Allen Co., Milwaukee; through Selzer-Ornst Co.

300 Tons, Lincoln, Ill., State grade separation bridge, to Mississippi Valley Structural Steel Co., St. Louis.

210 Tons, Sturtevant, Wis., State bridge, to Bethlehem Steel Co., Bethlehem, Pa.

270 Tons, Caledonia, N. D., bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.; through J. A. Jardine.

270 Tons, Nielsville, Minn., bridge, to American Bridge Co., Pittsburgh; through McGarry Brothers.

210 Tons, East Chicago, Ind., Washington High School, to Joseph T. Ryerson & Son, Inc., Chicago; through Charles Johnson.

205 Tons, Terre Haute, Ind., Y.M.C.A. building, to Gage Structural Steel Co., Chicago; through Glen North Construction Co.

190 Tons, Monroe County, Wis., bridge, to Midland Structural Steel Co., Cicero, Ill.

140 Tons, Seatonville, Ill., subway, to Milwaukee Bridge Co., Milwaukee.

130 Tons, Springfield, Ill., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

130 Tons, West Point, Ill., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

115 Tons, Lac Qui, Minn., bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

110 Tons, Indianapolis, armory, to Geiger & Peters, Indianapolis.

WESTERN STATES

925 Tons, San Diego, Cal., extension to assembly shop, to National Iron Works, San Diego.

615 Tons, Great Falls, Mont., hangar, to Minneapolis Moline Power Implement Co., Minneapolis; through Lease & Leigland.

170 Tons, Bonneville, Ore., steel stop logs for United States Engineer, to Worden-Allen Co., Milwaukee.

155 Tons, Clear Creek County, Colo., bridge, to Midwest Steel & Iron Works Co., Denver.

155 Tons, Sugar City, Idaho, State beam spans, to American Bridge Co.

150 Tons, McFarland and Shafter, Cal., schools, to Consolidated Steel Corp., Los Angeles.

135 Tons, Tulare, Cal., Kaweah River bridge, to Bethlehem Steel Co., San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

18,000 Tons, Brooklyn, superstructure, Meeker Avenue Bridge; American Bridge Co., Pittsburgh, low bidder.

16,500 Tons, New York, Criminal Courts building; bids received until Dec. 9 by Department of Public Works.

15,000 Tons, Jamestown, R. I., bridge over Narragansett Bay.

2000 Tons, Cape May, N. J., four bascule toll bridges; bids to County Highway Commission, Dec. 15.

1500 Tons, Rumson, N. J., bridge.

1200 Tons, Buffalo, Kenmore High School; C. F. Haglin & Sons, general contractors.

1000 Tons, New York, Family Court building; bids received by Department of Public Works until Dec. 9.

810 Tons, Washington, building No. 196, Navy Yard.

365 Tons, Rochester, N. Y., alterations to store building for National Clothing Co.

350 Tons, New York, repairs to Macombs Dam bridge; bids in.

325 Tons, State of New Jersey, highway bridge on route No. 6; bids Dec. 13.

325 Tons, Jamestown, N. Y., factory building for Hope's Windows, Inc.; bids Dec. 5.

300 Tons, Pittsburgh, Thaddeus Stevens School.

250 Tons, Lawrence, Mass., beam bridges.

125 Tons, Nassau, N. Y., school building.

100 Tons, Buffalo, lintels for housing development.

SOUTH AND SOUTHWEST

1900 Tons, Cave Spring, Ga., mill.

1780 Tons, Waurika, Okla., Red River highway bridge; Brooks & Dahlgren, Oklahoma City, low bidders on general contract.

1000 Tons, State of Oklahoma, eight highway bridges; bids due Dec. 9.

750 Tons, Pensacola, Okla., track elevation for St. Louis, San Francisco Railway; Leo Sanders, Oklahoma City, general contractor.

467 Tons, Pensacola, Fla., three bridges.

305 Tons, Pickens, Miss., bridge.

215 Tons, Kanawha, W. Va., Walker Creek overhead.

125 Tons, Grafton, W. Va., St. Mary's Street overhead.

100 Tons, Apache National Forest, N. M., bridge for Bureau of Public Roads, Santa Fe; bids Dec. 6.

CENTRAL STATES

1200 Tons, Kansas City, Mo., Kansas Avenue viaduct; List Construction Co., Kansas City, general contractor.

500 Tons, Topeka, Kan., auditorium; F. M. Spencer & Son, Topeka, general contractors.

160 Tons, Marion, Mich., State bridge over Muskegon River.

150 Tons, Racine, Wis., settling basin additions.

100 Tons, Cleveland, Cuyahoga Heights High School.

WESTERN STATES

4800 Tons, Alameda, Cal., Navy shop building (revise tonnage); bids Dec. 21.

1250 Tons, Portland, Ore., reconstruction of drydock towers; bids soon.

400 Tons, Bonneville Dam, river crossing towers for Department of Interior.

400 Tons, Lake Tahoe, Cal., hotel and casino; bids in.

217 Tons, Los Angeles, telephone building.

150 Tons, East Warren, Wyo., Fort Francis gym building.

FABRICATED PLATES

AWARDS

510 Tons, Battle Creek, Mich., 24 and 30-in. pipe, to American Rolling Mill Co., Middletown, Ohio.

NEW PROJECTS

2523 Tons, Los Angeles, 4.7 miles of 22, 31 and 37-in. pipe for Metropolitan Water District (revised tonnage) (concrete alternate); bids Dec. 12.

475 Tons, Crownover, Wash., roller gates, load disks, and auxiliary load rings for Roza Dam; bids postponed until Dec. 5.

SHEET PILING

AWARDS

300 Tons, Marked Tree, Ark., St. Francis drainage project, to Inland Steel Corp. and Bethlehem Steel Co., through List & Weatherly, Kansas City, Mo., general contractors.

. . . NON-FERROUS . . .

. . . Copper market undertone weakens in face of poor demand here and lower prices abroad . . . Zinc and lead quotations lowered.

A FURTHER weakening of the undertone of the domestic copper market was evident in the past week when supplies were sold in the open market at as much as one cent below the producers' price of 11.25c. per lb., Connecticut Valley. The continued absence of any sign of support from domestic buyers, together with additional declines in the foreign price to a low of 10.27c. per lb. on Tuesday, renders it unlikely that the present domestic price level will be maintained much longer, barring a sudden revival in demand which is considered improbable at this time of the year. Domestic sales in the past week totaled only 1400 tons, bringing the total for the month through Saturday to approximately 10,200 tons.

Lead

Although the lead market is generally in a more favorable statistical position than the other non-ferrous markets, the unsettled condition existing in the copper and zinc markets found reflection in the past week in the intensified caution being exercised by lead buyers in making commitments and in a $2 cut in quotations on Tuesday to a basis of 4.85c. per lb., St. Louis. Despite the current lull in purchases, shipments continue to go forth in undiminished volume and sellers anticipate another 40,000-ton month.

Zinc

Zinc prices were lowered $5 a ton on Tuesday to 4.50c. per lb., East St. Louis, making a total decrease of $11 a ton in the past eight days. These reductions were forced by the lowering of the import duties on foreign spelter in the Anglo-American trade pact. The new domestic price is about 10 points below the theoretical cost of imported metal at the present London price of 2.85c. per lb. These drastic price revisions have unsettled the market and current turnover consists only of such supplies as are necessary to cover immediate needs. Sales in the past week totaled 446 tons against 3203 tons in the preceding week.

Tin

The foreign situation and the lower zinc and lead prices continue to act as a damper on tin prices which would normally have advanced in the past week, in view of the fairly heavy futures business that was transacted, but which actually moved slightly lower. Tuesday's price of 45.90c. per lb., New York, for Straits metal, was 10 points below the price of Tuesday a week ago. Tin plate makers were again responsible for the bulk of the week's buying.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 23	Nov. 25	Nov. 26	Nov. 28	Nov. 29
Electro, copper[1]	11.25	11.25	11.25	11.25	11.25
Lake copper	11.375	11.375	11.375	11.375	11.375
Straits, tin, New York	46.125	45.95	...	45.625	45.90
Zinc, East St. Louis[2]	4.75	4.75	4.75	4.75	4.50
Lead, St. Louis[3]	4.95	4.95	4.95	4.95	4.85

[1] Delivered Conn. Valley, deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

	New York	Cleveland
Tin, Straits pig	47.00c.	49.75c.
Copper, lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.50c.	17.50c.
*Seamless brass tubes	20.25c.	20.25c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	13.375c.	13.375c.
Zinc slabs	6.25c.	7.25c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.875c.	5.60c.
Lead, bar	6.625c.	8.75c.
Lead sheets, cut	8.25c.	8.25c.
Antimony, Asiatic	15.00c.	17.75c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	29.00c.	29.75c.
Babbitt metal, commercial grade	22.75c.	22.50c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.375c.	9.125c.
Copper, hvy. and wire	7.375c.	7.875c.
Copper, light and bottoms	6.625c.	6.875c.
Brass, heavy	4.50c.	5.00c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.625c.	8.125c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or comps. turnings	6.375c.	7.00c.
Lead, heavy	4.00c.	4.875c.
Cast aluminum	7.50c.	8.75c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.50c.	3.75c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 12.25c. a lb. QUICKSILVER, $77 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.25c. a lb. lcl.

Hook Urges Removal of Coercive Elements in Industry

REMOVAL of the twin elements of compulsion and coercion from management-employee relations as the road to industrial peace was urged last week by Charles R. Hook, president of the National Association of Manufacturers.

In a plea for industrial peace and understanding before the Associated Industries of New York, Mr. Hook, who is also president of the American Rolling Mill Co., said that neither management nor labor union officials nor government should be permitted to force upon workers a particular system of selecting their representatives or a particular organization to represent them.

Waves of strikes and the unchecked use of the sitdown weapon, Mr. Hook said, were among the major causes for the precipitous decline of business activity in 1937.

IRON AND STEEL SCRAP

. . . Weakness in Chicago market has dropped composite 8c. to $14.92, despite gain in average at Pittsburgh.

NOV. 29.—Conflicting trends are noted in current scrap markets. At Chicago the week before considerable covering was being made at $15 and over on a mill order of $14.75, but since that time there has been a considerable tonnage of heavy melting steel sold to a mill at $14.50, with brokers now paying $14 to $14.25 to cover. As a result of this change in front, the average price on No. 1 at Chicago has been dropped 50c., more than offsetting a gain at Pittsburgh due to a narrowing of the quoted range. With the Philadelphia price unchanged, the composite price falls 8c., from $15 to $14.92, but still above the average of $14.88 prevailing two weeks ago. Last week anywhere from $15 to $16 was being paid by mills in the Pittsburgh district for No. 1 steel, but on more recent sales a range of $15.50 to $16 seems justified, advancing the average there 25c.

The market in other centers is relatively quiet, although bullish sentiment at Cincinnati has resulted in advances in dealer buying prices all along the line. Auto lists bid on at Detroit are in line with previously published prices. In the East, two heavy falls of snow have hampered yard operations and deliveries of trucks to barges. Meanwhile, the Japanese have purchased 140,000 tons of scrap iron and steel, this being the second purchase in November, the first being for 150,000 tons made the first few days of the month.

Pittsburgh

A small amount of No. 1 heavy melting steel was picked up during the last week at $15.50 a ton by a mill which had previously been paying $15. No. 1 is still going into consumption at other points in the district at $16 a ton or better, and hence is quoted this week at $15.50 to $16, up 25c. a ton from last week's average when a spread of $1 existed. Buying and selling appear to be better balanced for the first time in several weeks.

Chicago

Heavy melting is quoted at $14 to $14.50 following the sale of a considerable tonnage to a local mill at the higher figure. Brokers are paying no more than $14.25 and in some cases $14. Little material is coming out at these levels, however, but the quantity of scrap in the district and lowering mill operations should combine to keep the price from rising again, unless further sales are made, and a short position becomes general. Extensive covering was done at $15 and $15.25 it is understood, and one railroad accumulation is said to have brought close to $15.50. One explanation of the price drop is desire of "longs" to liquidate their holdings with the least possible loss, when it became apparent that consumers would not pay $15 and over.

Philadelphia

With a record snowfall blanketing yards, scrap collection and preparation are naturally in negligible volume and will remain so for the remainder of the week. But this situation has little effect on the domestic market as local mills show no interest in new commitments and are hardly likely to reverse their stand over the remainder of the year, what with operations in the aggregate hard pushed to hold at 37 per cent. Export continues as active as the weather permits. No. 1 and No. 2 steels are bringing $14.50 and $13.50, respectively, at Port Richmond. A boatload left for Italy yesterday and another boat is expected in within the fortnight. Bids went in today on 3700 tons of Budd bundles for December delivery, and prices will likely show some improvement over those of last month. Quite probably the material, or a good portion of it, will be disposed of in the export market.

Cleveland

Pending the closing of the customary monthly railroad lists, the market remains quiet. Dealers' offerings substantiate present quoted prices, particularly No. 1 heavy melting steel at $14 to $14.50.

Youngstown

The market here appears to have adopted an attitude of waiting for further developments. There has been no disturbance of publishable quotations either way, however.

Buffalo

The scrap market for the last few days has been very quiet. There are feelers out for larger tonnage but as yet no new business has resulted and shipments are being held up. Prices are firm. No. 1 heavy melting steel remains at $14 to $14.50, with the customary differential in No. 2 steel and the other allied grades.

St. Louis

More than 10,000 tons of heavy melting steel were sold by local dealers, 8500 tons to an East Side melter, and exceeding 2000 tons to a West Side mill that has been out of the market for months. The latter put on one open hearth furnace. These purchases have further strengthened the market. Railroad springs, machine shop turnings, rails for rolling and steel angle bars advanced 50c. a ton. Railroad lists: Baltimore & Ohio, 6820 tons; Illinois Central, 3775 tons; Alton, 265 tons; Chicago, Milwaukee, St. Paul & Pacific, 180 tons.

Cincinnati

Consumer interest in buying is noticeable, but dealers are holding for good prices. Bids are up in effort to attract more material into the market to meet anticipated heavy ordering during the next month.

Detroit

A Chrysler scrap list which closed Monday gave indication that Detroit scrap prices are maintaining the level of recent weeks. Higher prices brought by a few items were generally attributed to the fact that the items are specialties. On Wednesday numerous other lists were schduled to close.

New York

Purchases of 140,000 tons of scrap iron and steel by Japanese interests were made in the last few days at a price around $15.50, f.a.s. Atlantic, Gulf and Pacific ports, for the No. 1 heavy melting grade. Meanwhile scrap preparation and scrap handling in the metropolitan area have been practically at a standstill since Thanksgiving as a result of two heavy snowfalls. Delivery of truckload lots to barges has been particularly hampered at both ends of the line, and as a result some fancy prices have been paid for material loaded on cars in some isolated instances. Since the condition is purely a temporary one, brokers see no need to advance prices generally to draw out material. Domestic sales continue very light.

Boston

Aside from steel for export and cast for New England consumption there is very little to the local market. Prices offered by Pennsylvania mills for material apparently are not attractive to holders, and little or no distress scrap is coming into the market. Textile and machinery cast, although not really active, are more so than at any previous time this month. Delivered prices paid recently were $13.50 to $15 a ton, the price depending on the destination. A Providence foundry, out of the market since last spring, has just placed a tonnage.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.50 to $16.00
Railroad hvy. mltng..	15.75 to 16.25
No. 2 hvy. mltng. steel.	14.25 to 14.75
Scrap rails	16.00 to 16.50
Rails 3 ft. and under..	17.00 to 17.50
Comp. sheet steel	15.50 to 16.00
Hand bundled sheets..	14.50 to 15.00
Hvy. steel axle turn..	14.00 to 14.50
Machine shop turn....	9.75 to 10.25
Short shov. turn.....	9.75 to 10.25
Mixed bor. & turn....	8.25 to 8.75
Cast iron borings.....	8.25 to 8.75
Cast iron carwheels...	14.50 to 15.00
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	15.25 to 15.75
RR. knuckles & cplrs.	16.50 to 17.00
Rail coil & leaf springs	16.50 to 17.00
Rolled steel wheels...	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Low phos. punchings..	16.50 to 17.00
Low phos. plate	16.50 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.00 to 13.50
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old..	11.50 to 12.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	16.50 to 17.00
Hvy. breakable cast...	.... 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn....	8.50 to 9.00
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.00 to 10.50
No. 1 low phos. hvy...	16.50 to 17.00
Couplers & knuckles..	16.50 to 17.00
Rolled steel wheels ..	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	20.00 to 20.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire.....	11.00 to 11.50
Cast borings (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy mltng. steel	$14.00 to $14.50
Auto. hvy. mltng. steel alloy free	12.50 to 13.00
No. 2 auto. steel	11.25 to 11.75
Shoveling steel	14.00 to 14.50
Factory bundles	13.00 to 13.50
Dealers' bundles	12.00 to 12.50
Drop forge flashings..	11.50 to 12.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old..	6.25 to 6.75
Rolled carwheels	15.25 to 15.75
Railroad tires, cut....	16.25 to 16.75
Railroad leaf springs..	15.75 to 16.25
Steel coup. & knuckles	15.25 to 15.75
Axle turnings	12.75 to 13.25
Coil springs	16.75 to 17.25
Axle turn. (elec.)	13.75 to 14.25
Low phos. punchings..	16.25 to 16.75
Low phos. plates 12 in. and under	15.75 to 16.25
Cast iron borings	5.25 to 5.75
Short shov. turn.	7.00 to 7.50
Machine shop turn....	7.00 to 7.50
Rerolling rails	17.25 to 17.75
Steel rails under 3 ft..	15.75 to 16.25
Steel rails under 2 ft..	16.25 to 16.75
Angle bars, steel	15.25 to 15.75
Cast iron carwheels...	.... 12.75
Railroad malleable	14.75 to 15.25
Agric. malleable	11.25 to 11.75
	Per Net Ton
Iron car axles	19.25 to 19.75
Steel car axles	19.25 to 19.75
Locomotive tires	15.25 to 15.75
Pipes and flues	9.25 to 9.75
No. 1 machinery cast.	12.25 to 12.75
Clean auto. cast.	12.25 to 12.75
No. 1 railroad cast....	11.25 to 11.75
No. 1 agric. cast.....	10.75 to 11.25
Stove plate	8.25 to 8.75
Grate bars	8.25 to 8.75
Brake shoes	9.25 to 9.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Low phos. plate	16.00 to 16.50
No. 1 busheling	13.50 to 14.00
Hydraulic bundles	14.25 to 14.75
Machine shop turn....	9.75 to 10.25

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	14.00 to 14.50
Light bund. stampings	11.00 to 11.50
Drop forge flashings..	13.00 to 13.50
Machine shop turn....	7.00 to 7.50
Short shov. turn.....	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings....	11.00 to 11.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	7.75 to 8.25
Mixed bor. & turn....	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	16.50 to 17.00
Railroad grate bars ..	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable ...	15.50 to 16.00
Cast iron carwheels ..	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	12.00 to 12.50
Old hydraul. bundles..	11.00 to 11.50
Drop forge flashings...	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings....	10.50 to 11.00
Machine shop turn....	6.75 to 7.25
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.....	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	17.50 to 18.00
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	14.50 to 15.00
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$13.25 to $13.75
No. 1 hvy. melting....	13.25 to 13.75
No. 2 hvy. melting....	12.25 to 12.75
No. 1 locomotive tires.	13.25 to 13.75
Misc. stand. sec. rails.	13.75 to 14.25
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	4.00 to 4.50
Machine shop turn....	5.00 to 5.50
Heavy turnings	9.00 to 9.50
Rails for rolling	17.00 to 17.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought....	10.75 to 11.25
No. 2 RR. wrought....	13.25 to 13.75
Steel rails under 3 ft..	15.50 to 16.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast..	14.50 to 15.00
Railroad malleable ...	12.50 to 13.00
No. 1 railroad cast....	12.50 to 12.75
Stove plate	9.00 to 9.50
Grate bars	8.50 to 9.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$12.00 to $12.50
No. 2 hvy. mltng. steel.	9.75 to 10.25
Scrap rails for mltng.	15.75 to 16.25
Loose sheet clippings.	7.25 to 7.75
Hydrau. b'ndled sheets	11.50 to 12.00
Cast iron borings	4.50 to 5.00
Machine shop turn....	5.75 to 6.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	3.25 to 3.75
Rails for rolling	18.00 to 18.50
No. 1 locomotive tires.	14.75 to 15.25
Short rails	18.50 to 19.00
Cast iron carwheels...	13.25 to 13.75
No. 1 machinery cast.	14.00 to 14.50
No. 1 railroad cast.....	13.25 to 13.75
Burnt cast.	7.25 to 7.75
Stove plate	7.25 to 7.75
Agricul. malleable	12.25 to 12.75
Railroad malleable	14.75 to 15.25
Mixed hvy. cast.	11.00 to 11.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast.	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$10.75 to $11.25
No. 2 hvy. mltng. steel.	9.00 to 9.50
Borings and turnings.	5.75 to 6.25
Long turnings	5.50 to 6.00
Short shov. turnings..	6.50 to 7.00
No. 1 machinery cast..	12.25 to 12.75
Automotive cast	13.50 to 14.00
Hvy. breakable cast...	9.75 to 10.25
Hydraul. comp. sheets.	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel...	10.75 to 11.25
Sheet clippings	8.50 to 9.50
Flashings	9.00 to 9.50
Low phos. plate scrap	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	12.00 to 12.50
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace...	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†....	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.....	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	$10.15
Machine shop turn....	.... 3.33
Mixed bor. & turn.....	$2.00 to 2.25
Bun. skeleton long....	.... 8.15
Shafting	10.25 to 10.50
Cast bor. chemical....	5.50 to 5.75
Per gross ton delivered consumers' yards:	
Textile cast	$13.50 to $15.00
No. 1 machine cast....	13.50 to 15.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.50	$9.00
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	7.00	6.50
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	3.50	3.00
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	10.00 to 10.50
No. 2 cast	.... 11.00
Stove plate	$10.00 to 10.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$13.25 to $13.50
No. 2 hvy. mltng. steel.	12.25 to 12.50
Rails (scrap)	.... 13.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.00 to 13.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia, delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS*

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	4.40
Pittsburgh or Gary	$4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate

Pittsburgh, Chicago and Gary	3.15c.
Granite City	3.25c.
On cars dock Pacific ports, boxed	4.10c.

NOTE: No. 29 gage is heaviest in which tin mill black plate is sold. No. 28 and heavier taking sheet base. There are no gages which take the above base prices as extras are applicable in all cases.

HOT ROLLED STRIP

Prices F.o.b. Unless Otherwise Noted

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP**

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51 .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.20
Woven wire fence, base column.	67
Single loop bale ties. base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool..	$2.54

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in ecah case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	56	36	¼ & ⅜	+ 9	+30
¼ to ⅜	59	43½	½	24	6½
½	63½	54	¾	30	13
¾	66½	58	1 & 1¼	34	19
1 to 3	68½	60½	1½	38	21½
			2	37½	21

Lap Weld

2	61	52½	2	30½	15
2½ & 3	64	55½	2½ to 3½	31½	17½
3½ to 6	66	57½	4	33½	21
7 & 8	65	55½	4½ to 8.	32½	20
9 & 10	64½	55	9 to 12.	28½	15
11 & 12	63½	54			

Butt weld, extra strong, plain ends

⅛	54½	41½	¼ & ⅜	+10	+43
½ to ⅜	56½	45½	½	25	9
½	61½	53½	¾	31	15
¾	65½	57½	1 to 2	38	22½
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	33½	18½
2½ & 3	63	55½	2½ to 4.	39	25½
3½ to 6.	66½	59	4½ to 6.	37½	24
7 & 8.	65½	56	7 & 8.	38½	24½
9 & 10.	64½	55	9 to 12.	32	20½
11 & 12.	63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 3 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.79	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2½ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Pet Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts: ½ in. & 6 in. and smaller.	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1½ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped: ½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-fin. hexagon nuts U.S.S. S.A.E.

¼ to 7/16 in. incl.	65-10	70-5
½ to 9/16 in.	65-5	70
⅝ to 1-in. incl.	60-10	65
1⅛ in. and larger	60-5	60-5

Beyond the above, an additional 10 per cent allowed for full container quantities.

Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	$3.40

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

(Freight allowed to destination)

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ⅜ in. and smaller.	70 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67½ and 10
Upset set screws, cup and oval points	75 and 10
Milled studs	60½ and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2⅛ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes.	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth.	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 5s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown*	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa. Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio
Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, 1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 13%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs. nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports
Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore
Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12½c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	32c.
Man., African, Indian, 44-48%	30c.
Man., African, Indian, 49-51%	32c.
Man., Brazilian, 46 to 48½%	29c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$20.00
Tungsten, domestic, scheelite delivered	$20.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	23.00
Turkish, 48-49%	23.00
Turkish, 45-46%	19.00
Turkish, 40-44%	16.00
Chrome concentrates (Turkish) c.i.f Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	22.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

No. 2 or diesel, f.o.b. Bayonne	4.125c.
No. 6, f.o.b. Bayonne	2.26c.
Del'd Chicago, No. 5 Bur. Stds.	3.25c.
Del'd Chicago, No. 6 Bur. Stds.	2.75c.
Del'd Cleve'd, No. 3 distillate	5.50c.
Del'd Cleve'd, No. 4 industrial	5.25c.
Del'd Cleve'd, No. 5 industrial	3.00c.
Del'd Cleve'd, No. 6 industrial	2.75c.

COKE

Per Net Ton.

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.60c.
**Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.75c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
** On reinforcing bars base applies to orders of less than one ton and includes switching and cartting charge.
All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.83c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.60 to 4.85c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, ⅛ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$3.25

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over)	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less
† 500 lb., base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.82c.
Bars, soft steel (rounds and flats)	3.87c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	5.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.36c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.50c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 25 bundles or over.
‡For one to five tons.

BIRMINGHAM

Bars and bar shapes	$3.85 base		
Structural shapes and plates	3.75	"	
Hot rolled sheets No. 10 ga.	3.80	"	
Hot rolled sheets No. 24 ga.	4.40	"	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	"	3500 lb. or more
Strip	4.05	"	
Reinforcing bars.	3.85	"	
Floor plates	5.96	"	
Cold finished bars	4.91	"	
Machine and carriage bolts	.....50 & 10 off list		
Rivets (structural)	$4.60 base		

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.85c.	4.00c.	4.05c.
Shapes, standard	3.95c.	4.00c.	4.05c.
Soft steel bars	4.05c.	4.00c.	4.30c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.675c.	open.	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	4.20c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.50c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.50c.
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.20	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

MEMPHIS

	Base per Lb.
Mild steel bars	4.01c.
Shapes, bar size	4.01c.
Iron bars	4.01c.
Structural shapes	3.96c.
Plates	3.96c.
Hot-rolled sheets	3.91c.
Galvanized sheets, No. 24	5.26c.
Steel bands	4.16c.
Cold-drawn rounds	4.61c.
Cold-drawn flats, squares, hexagons	6.61c.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Machine tool demand sluggish in most centers, with present output chiefly for export . . . Broadening of inquiries points to better business in 1939 . . . Automotive industry begins buying again.

Cincinnati Builders Report Sluggish Demand

CINCINNATI — Machinery demand is sluggish in this area. Average ordering is about 40 per cent of capacity, but there is no vigor to the market. Foreign ordering still overshadows domestic by fair margin, although the latter is encouragingly steady. Inquiry is still active and the potential demand is reported large. Lathe ordering is most active, with millers and grinders not far behind. Drilling machinery, which still is of interest from an inquiry standpoint, is without new business. Heavy tools are in moderate demand and give a substantial background to the present market.

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for Speed and Profit

● Jobs that require welding in all positions—overhead, vertical and horizontal—jobs that must stand rigid inspection and meet high strength requirements—jobs that must be put through in limited time—are handled to best advantage with Page Hi-Tensile "C" Electrodes.

Hi-Tensile "C" has speeded up many jobs, reduced many cost records. It is a quiet, steady electrode that causes very little spatter and slag loss. Used with greatest convenience and efficiency when work must be done in close quarters. Adaptable to production, maintenance and repair work.

Your local Page distributor will show you how Page Hi-Tensile "C" and other Page Electrodes speed up work and increase profits.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE COMPANY, Inc.
MONESSEN, PENNSYLVANIA

In Business for Your Safety

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PAGE *Welding* WIRE

New Orders at Slower Rate in Chicago District

CHICAGO—Although November bookings of machine tools are expected to be about on a par with October, orders are now being received at a slower rate than a month ago. Small tool demand also is lighter. No definite programs or lists are looked for until after the first of the year, until which time business will consist of the purchase of single machines here and there. The trade here is awaiting the new Congress and is confident that its independent actions will stimulate business immediately.

Output of N. Ohio Builders Chiefly for Export

CLEVELAND — Sales and production are holding steady in this district at present, but it is expected some evidence of a normal seasonal contraction will become more apparent over the next few weeks. Output remains centered upon foreign business. Domestic inquiry includes a sprinkling of armament tools and single machines for other purposes.

Press manufacturers report November and October countrywide sales over 50 per cent ahead of August and September, the percentage of gain being even higher in northern Ohio and Michigan. Makers of electric motors, washing machines and similar equipment have been buying actively.

One automotive plant is disposing of 100 screw machines, boring mills, and other production machinery.

Ford and G.M. Begin To Buy Machinery Again

DETROIT—First signs of increasing machine tool activity were detected last week, it is believed, in authenticated reports that Ford Motor Co. and one of the General Motors units have begun to purchase equipment again. In one case, gear chamfering machinery was ordered. Meanwhile, the number of inquiries has shown a moderate increase throughout the industry. An initial estimate of the proposed changes in design to be made in 1940 should be completed by most automobile plants in 30 to 60 days, at which time the first steps will be taken to launch new car tooling programs.

Holiday Week Slows Up Sales Of Metropolitan Dealers

NEW YORK—The Thanksgiving holiday, coming in the middle of the week, tended to slow up sales activity among dealers in this area, when the month as a whole was lagging far behind October in point of sales volume. Those sales that have been made have been spotty, and practically none of them could be attributed to renewed confidence following the elections. On the other hand, inquiry seems to be broadening, and should result in a better volume, particularly since manufacturing schedules are being advanced and more men are being called back to work. Little of this business, however, is expected to materialize until after the end of the year when 1939 budgets become effective. Buying on the part of the aircraft industry continues to hold the spotlight and will probably increase in volume to meet the announced government aircraft program.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

General Electric Co., Schenectady, N. Y., has let general contract to Heller-Murray Co., 222 West Rayen Street, Youngstown, Ohio, for two-story and basement factory branch, storage and distributing plant at Niles, Ohio. Cost close to $60,000 with equipment.

Manhattan Sheet Metal Works, 608 East Eighteenth Street, New York, has leased one-story building on Forty-seventh Road, near Fifth Street, Long Island City, for plant, removing present works to new location and increasing capacity.

American Tobacco Co., 111 Fifth Avenue, New York, has let general contract to George W. Kane, Durham, N. C., for five-story and basement addition, 90 x 280 ft., to main plant at Durham. Cost over $450,000 with mechanical-handling and other equipment. An air-conditioning system will be installed. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until Dec. 6 for 22 steel buoy bodies, from 3½ ft. in diameter by 10 ft. long, to 9 ft. diameter by 39 ft. long, with steel skeleton lantern towers and bottom counterweights; some welded and some riveted; until Dec. 7 for 19 steel buoys; until Dec. 12 for 952 pieces of wrought iron open-link buoy chain, from ¾-in. to 1⅝-in. diameter; 128 wrought iron chain bridles for buoys.

Connell Wood & Metal Patterns, Inc., 4238 Park Avenue, Bronx, New York, has leased about 10,000 sq. ft. of floor space in building at 4077 Park Avenue for plant, removing present works to new location and increasing capacity.

United Air Lines, 221 North LaSalle Street, Chicago, has leased large steel hangar at New York municipal airport and terminal, North Beach, Queens, L. I., now in course of construction, for metropolitan terminus, with shop and reconditioning facilities. It is scheduled for completion next April.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Dec. 6 for one grinding machine (Circular 70).

Continental Oil Co., 60 East Forty-second Street, New York, plans rebuilding main pumping station at Lance Creek, Wyo., used for crude oil pipe line service in local oil field district, recently destroyed by fire. Loss about $100,000 with pumping units and accessories. Division offices of company are at Ponca City, Okla.

Board of Education, Town Hall, Hillside, N. J., plans manual training department in new three-story and basement high school, for which bids have been asked on general contract. Cost about $500,000. Financing has been arranged through Federal aid. Charles F. Ackerman, 45 Clinton Street, Newark, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 6 for one motor-driven centering machine (Schedule 4976) for Philadelphia Navy Yard; 5820 hacksaw frames (Schedule 4908) for Philadelphia, Norfolk, Sewall's Point, Mare Island and Puget Sound Navy yards.

York Safe & Lock Co., Loucks Mill Road, York, Pa., manufacturer of bank safes, vaults, etc., has approved plans for one-story addition, 80 x 100 ft. Cost close to $45,000 with equipment.

Public Works Officer, Navy Yard, Philadelphia, has let general contract to Turner Construction Co., New York, and Architects' Building, Philadelphia, for superstructure for one-story pipe and copper shop, at $230,800, exclusive of equipment (Specifications 9006).

BUFFALO DISTRICT

National Gypsum Co., 190 Delaware Avenue, Buffalo, manufacturer of building materials, wall board, etc., plans additions to branch plant at East 150th Street and East River, New York, comprising several one-story units. Cost over $500,000 with equipment. D. F. Hunt is chief engineer.

Socony-Vacuum Oil Co., 1100 Elk Street, Buffalo, will expend over $1,000,000 for expansion and improvements in local Atlas refinery instead of smaller sum, previously noted in these columns, and will begin work at once. Machinery will be installed for production of high-octane gasoline under Houdry process, with additional steel tank storage and distribution facilities, and other operating equipment. Main offices of company are at New York.

NEW ENGLAND

Armstrong Rubber Co., West Haven, Conn., automobile tires and tubes, has let general contract to Hewlett Construction Co., 1385 Iranistan Avenue, Bridgeport, Conn., for one-story top addition, 80 x 220 ft., to plant unit, for storage and distribution. Cost over $65,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, is architect and engineer.

School Buildings Department, City of Boston, 28 Norman Street, has let general contract for superstructure to John Bowen Co., 129 Newbury Street, for three-story and basement addition to Practical Arts High School, Roxbury, 54 x 65 ft., and improvements in present building. Cost about $79,000, exclusive of equipment. Kilham, Hopkins & Greeley, 126 Newbury Street, are architects.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 7 for three light tool and cutter grinders (Circular 141), combination oil reclaimer and washer (Circular 155); until Dec. 8, one horizontal four-spindle barrel-drilling machine (Circular 158), two hydraulic marking machines (Circular 159); until Dec. 9, 12-spindle barrel-type reaming machine, with hydraulic feed system, motors and controls (Circular 156), 10 rebuilt index heads for milling machines (Circular 174), two hand-operated die-sinking machines (Circular 157).

WASHINGTON DIST.

Pan-American Airways System, 135 East Forty-second Street, New York, has leased section of aircraft plant of Curtiss-Caproni Co., Dundalk district, Baltimore, for extensions in local terminal, including hangar, repair and reconditioning facilities.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for superstructure for one-story shop at local navy yard (Specifications 9051); until Dec. 7, one-story building for ordnance storehouse at same yard (Specifications 8998); bids (no closing date stated) for one-story addition, 240 x 300 ft., to structural shop at Norfolk Navy Yard, Va. (Specifications 8997).

Glenn L. Martin Co., Middle River, Baltimore, military and other airplanes and parts, is arranging for sale of 156,000 additional shares of stock, to total about $3,120,000, part of proceeds to be used for expansion, including new airfield, hangar and shop buildings, and other structures.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Dec. 19 for two or three charcoal and soda lime mixing machines, five or seven chemical container filling machines, and 32 to 34 chemical container bottom presses (Circular 164); until Dec. 20, one mixing machine bin, and one charcoal and soda lime mixture bin (Circular 163).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 6 for one drill grinder (Schedule 4975), one engraving machine and equipment (Schedule 4977), 20,000 ft. of bandsaw blades (Schedule 4964) for Washington yard; die-cutting and profiling machine (Schedule 4980), for Charleston, S. C., yard; lathe (Schedule 4990) for Sewall's Point Navy Yard; two squaring shears (Schedule 4978) for Norfolk yard; chopping axes, carpenters' hammers, copper hammers, engineers', machinists', scaling and tinners' hammers, blacksmiths' sledges, shingling hatchets, tinners' mallets (Schedule 4917), clamps and punches (Schedule 4899); until Dec. 9, motor-in-head type double surface planer, with spare parts (Schedule 4938) for Eastern and Western Navy yards, all machines to be motor-driven; two gasoline engine-driven portable arc welding sets and one similar set, stationary type (Schedule 4953) for Brooklyn Navy Yard.

SOUTH ATLANTIC

Southern Fertilizer & Chemical Co., Savannah, Ga., has let general contract to Dobson Lumber Co., Greer, S. C., for one-story branch plant, 112 x 120 ft., on Spartanburg-Laurens highway, near Spartanburg, S. C. Cost over $50,000 with equipment.

Duke Power Co., Charlotte, N. C., plans new steam-electric generating station, for which site is being selected in Piedmont area. Transmission lines will be built for connection with present high-tension system of company, including switching stations and other operating facilities. Cost about $1,000,000 with high-pressure boilers, turbo-generators and auxiliary equipment. Charles I. Burkholder is vice-president and chief engineer.

SOUTH CENTRAL

Standard Oil Co., Chattanooga, Tenn., is closing negotiations for tract in Tannery Flat district, for new bulk oil storage and distributing terminal, with waterfront facilities for barge transportation. It will include steel tank division, pumping station and other operating facilities. Cost over $75,000 with equipment.

Glenmore Distilleries Co., 660 South Fourth Street, Louisville, plans early rebuilding of part of main distilling plant at Owensboro, Ky., recently destroyed by fire, including total destruction of six one and multi-story buildings. Loss over $1,000,000 with equipment.

City Council, Clanton, Ala., asks bids until Dec. 6 for 400,000-gal. steel reservoir for raw water service; three 100,000-gal. elevated steel tanks and towers, valves, fittings, etc. (Contract No. 1). J. W. Goodwin Engineering Co., Martin Building, Birmingham, is consulting engineer.

Dixie Bottling Co., Inc., 416 Hermitage Avenue, Nashville, Tenn., Joseph L. Jenkins, head, plans new one-story mechanical bottling plant. Cost over $40,000 with equipment.

SOUTHWEST

National Vendors, Inc., 5149 Natural Bridge Avenue, St. Louis, manufacturer of cigarette vending machines and parts, and allied machines, has let general contract to William H. & Nelson Cunliff Co., 3320 Lindell Avenue, for two-story and basement addition, 85 x 140 ft. Cost over $60,000 with equipment.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, is arranging new preferred stock issue of 50,000 shares, to total about $5,000,000, considerable part of fund to be used for expansion and improvements in plants.

Board of Education, Iola, Kan., asks bids until Dec. 7 for new vocational school on senior high school grounds. Cost about $100,000 with equipment. Lorentz Schmidt, 1805 East Second Street, Wichita, Kan., is architect.

City Council, Perry, Okla., has plans for extensions and improvements in municipal electric light and water station, including additional equipment. Cost about $82,000, of which $36,000 will be a Federal grant. V. V.

Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Hull & Dillon Packing Co., Pittsburg, Kan., meat packer, has asked bids on general contract for two-story and basement addition, 86 x 140 ft. Cost over $50,000 with equipment. Daniel R. Sandford, Wilhoit Building, Springfield, Mo., is architect.

Crane Co., Corpus Christi, Tex., plans new one-story factory branch, storage and distributing plant at 1212 Gavilan Street. Cost close to $50,000 with equipment. Bids will be asked on general contract early this month. Hamon & Co., Texas State Bank Building, are architects. Main offices of company are at Chicago.

Brock Pattern Works, 212 Pacific Street, Houston, Tex., manufacturer of metal patterns, plans new one-story plant on Lockwood Drive. Cost about $40,000 with equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Dec. 5 for one motor-driven power pipe threading machine (Circular 12).

WESTERN PA. DIST.

Continental Can Co., 100 East Forty-second Street, New York, has purchased about 7½ acres at West First and Mineral Streets, Oil City, Pa., for new plant, recently referred to in these columns. Initial unit will be one-story, 160 x 400 ft., with smaller buildings for storage and distribution, for production of sealed cans for lubricating and other oils. Cost close to $500,000 with equipment.

Wheeling Corrugating Co., Wheeling, W. Va., has let general contract to Austin Co., Arcade Building, St. Louis, for one and two-story factory branch, storage and distributing plant on South Vandeventer Street, St. Louis, totaling about 125,000 sq. ft. of floor space. Two-story section, 70 x 145 ft., will be used largely for office service. Cost over $250,000 with equipment.

MICHIGAN DISTRICT

Hinde & Dauch Paper Co., Decatur Street, Sandusky, Ohio, manufacturer of corrugated fiber boxes and containers, plans new branch mill at West Chicago Avenue and Pennsylvania Railroad, Detroit, consisting of a main one-story unit, 200 x 510 ft., and several smaller structures for storage, distribution and other service. Plant is scheduled for completion next April. Cost over $300,000 with mechanical-handling and other equipment.

Stahlin, Inc., Belding, Mich., recently organized to manufacture floodlighting equipment, heating devices and other electrical products, has leased part of Red Mill building for plant.

Quartermaster, CCC, Camp Custer, Mich., asks bids until Dec. 5 for power hacksaws, scroll saws, motor-driven shapers, steel stands, electric drills, electric motors and other equipment (Circular 4602-24).

Village Council, Clinton, Mich., has arranged fund of $122,200 for a municipal electric power plant, of which $66,000 will be a Federal grant. It is proposed to use diesel engine-generator units.

OHIO AND INDIANA

Dracco Corp., 4063 East 116th Street, Cleveland, manufacturer of pneumatic conveying systems and parts, air filter equipment, etc., has let contract to Mooney Iron Works Co., 3319 East Eightieth Street, for one-story addition, 70 x 122 ft. Cost over $40,000 with equipment.

Columbus Packing Co., 1976 South High Street, Columbus, Ohio, meat packer, a subsidiary of Armour & Co., Chicago, plans expansion and improvements, including additional equipment and extensions in several buildings. Cost about $250,000 with equipment. Engineering department of parent company will be in charge.

City Council, Troy, Ohio, asks bids until Dec. 13 for extensions and improvements in municipal electric power plant, including additional equipment. Cost about $175,700. Froehlich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 5 for stranded cable, switches, etc. (Circular 389); until Dec. 6 for plate and self-locking nuts (Circular 384), 17,500 ft. of steel cable, ⅛-in. diameter (Circular 397), one coupling testing fixture and one motor-driven oil pump (Circular 391); until Dec. 7, 10 de-icer pump assemblies, and two gear-type oil pump assemblies (Circular 394); until Dec. 8, one power-driven hacksaw (Circular 395); until Dec. 9, hollow steel propeller blades, propeller hub assemblies, booster assemblies, etc. (Circular 383).

Board of School Commissioners, 150 North Meridian Street, Indianapolis, asks bids on general contract until Dec. 6 for two-story and basement addition to Arsenal technical high school, East Michigan Street. Cost about $600,000 with equipment. Pierre & Wright, Architects' and Builders' Building, are architects; D. A. Bohlen & Son, Majestic Building, are supervising architects; Bevington-Williams, Inc., Indiana Pythian Building, is mechanical engineer.

MIDDLE WEST

Winnebago Distillery Co., 105 West Monroe Street, Chicago, has asked bids on general contract for new distilling plant on State highway No. 25, near Elgin, Ill. It will consist of main distillery, vat building, granary, bottling plant, power house and other structures, including an eight-story storage and distributing building. Cost about $700,000 with equipment. Paul Gerhardt, 457 West Fullerton Avenue, Chicago, is architect.

Keystone Steel & Wire Co., Industrial Avenue, Bartonville, Peoria, Ill., manufacturer of wire fencing, nails and other wire products, plans rebuilding part of plant recently destroyed by fire. Loss close to $125,000 including equipment. Loss included two large buildings, with three other companies occupying leased space sustaining losses as follows: W. A. Laidlaw Wire Co., baling wire, wire ties, etc., about $175,000; Sommer Products Co., mechanical specialties, about $150,000; Mabey Electric & Mfg. Co., electrical products, about $50,000. These companies plan re-establishment of plants.

City Council, Glidden, Iowa, asks bids until Dec. 12 for one 425-hp. diesel engine generator unit with accessory equipment, and alternate bid on one 375-hp. similar generating unit for municipal electric power plant. C. M. Stanley, Muscatine, Iowa, is consulting engineer.

Hump Hairpin Mfg. Co., 1918 South Prairie Avenue, Chicago, wire goods, plans three-story and basement addition. Cost over $50,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Office of Supervising Construction Engineer, Fratt Building, Billings, Mont., asks bids until Dec. 6 for diesel engine-generating unit and accessories, about 100-kw. capacity, for installation at Rosebud, S. D.

City Council, Dayton, Iowa, asks bids until Dec. 5 for municipal electric power plant, including generating unit and auxiliary equipment; also for extensions and improvements in distributing system. Ralph W. Gearhart, 341 Twenty-first Avenue, S.E., Cedar Rapids, Iowa, is consulting engineer.

Wisconsin Power & Light Co., Madison, Wis., has announced 1939 improvement program costing $1,225,000, of which $900,000 will be expended for sub-stations, additional transformers, and other equipment, and $350,000 for rural transmission line extensions.

Six Point Seal Corp., Oregon, Wis., has plans by John J. Flad, architect, Cantwell Building, Madison, Wis., for first unit of new factory, 40 x 60 ft., one-story, without basement.

Board of Education, Madison, Wis., has placed general contract with George Nelson & Son, local, for manual arts addition, 45 x 165 ft., two stories, without basement, to cost about $100,000 complete. M. E. Johnson is superintendent of buildings and grounds.

Drummond Packing Co., Galloway Street, Eau Claire, Wis., has placed general contract with Hoeppner-Bartlett Co., local, for plant addition, containing 105,000 cu. ft., costing about $50,000 with motors and other equipment.

PACIFIC COAST

Mission Water Heater Co., 7101 McKinley Avenue, Los Angeles, has plans for one-story addition, 65 x 120 ft. Cost over $40,000 with equipment. Albert C. Martin, Higgins Building, is architect.

Pacific Packing Co., Fowler, Cal., plans rebuilding fruit processing and packing plant recently destroyed by fire. Loss over $400,000 with conveying, loading and other equipment.

Constructing Quartermaster, Sacramento, Cal., asks bids until Dec. 21 for furnishing and installing one bridge crane.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for superstructure for one-story machine shop, 250 x 900 ft., at Mare Island Navy Yard (Specifications 8995); until Dec. 21 for steel caisson gate at Puget Sound Navy Yard, including pumps, gate valves, fittings, motors and electrical installation (Specifications 8969).

Jones & Orth Cutter Head Co., 1931 First Street, South, Seattle, manufacturer of cutter heads, knives and other edged products, has let general contract to H. D. Stewart, 2045 East Newton Street, for new one-story plant, 100 x 150 ft. Cost over $50,000 with equipment. Theodore Buckinger, 7304 Thirty-third Street, N.W., is architect.

Whittier Walnut Packing Co., Whittier, Cal., plans rebuilding processing and packing plant, recently partially destroyed by fire. Loss about $50,000 with equipment, including conveyors, loaders, etc.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 9 for one pneumatic drop hammer (Schedule 4958); two motor-driven portable band saws (Schedule 4956), one motor-driven vertical wood-boring machine (Schedule 4955) for Puget Sound Navy Yard; until Dec. 13, one motor-driven engine lathe (Schedule 4985) for San Diego Naval Air Station; one motor-driven power hacksaw and six sets of carbon brushes (Schedule 4984) for Mare Island yard.

FOREIGN

Gloster Aircraft Co., Ltd., Brockworth Aerodrome, Gloucester, England, has selected tract near present works for addition, comprising one and multi-story units for production of certain types of aircraft, parts manufacture and assembling. Cost about $5,000,000.

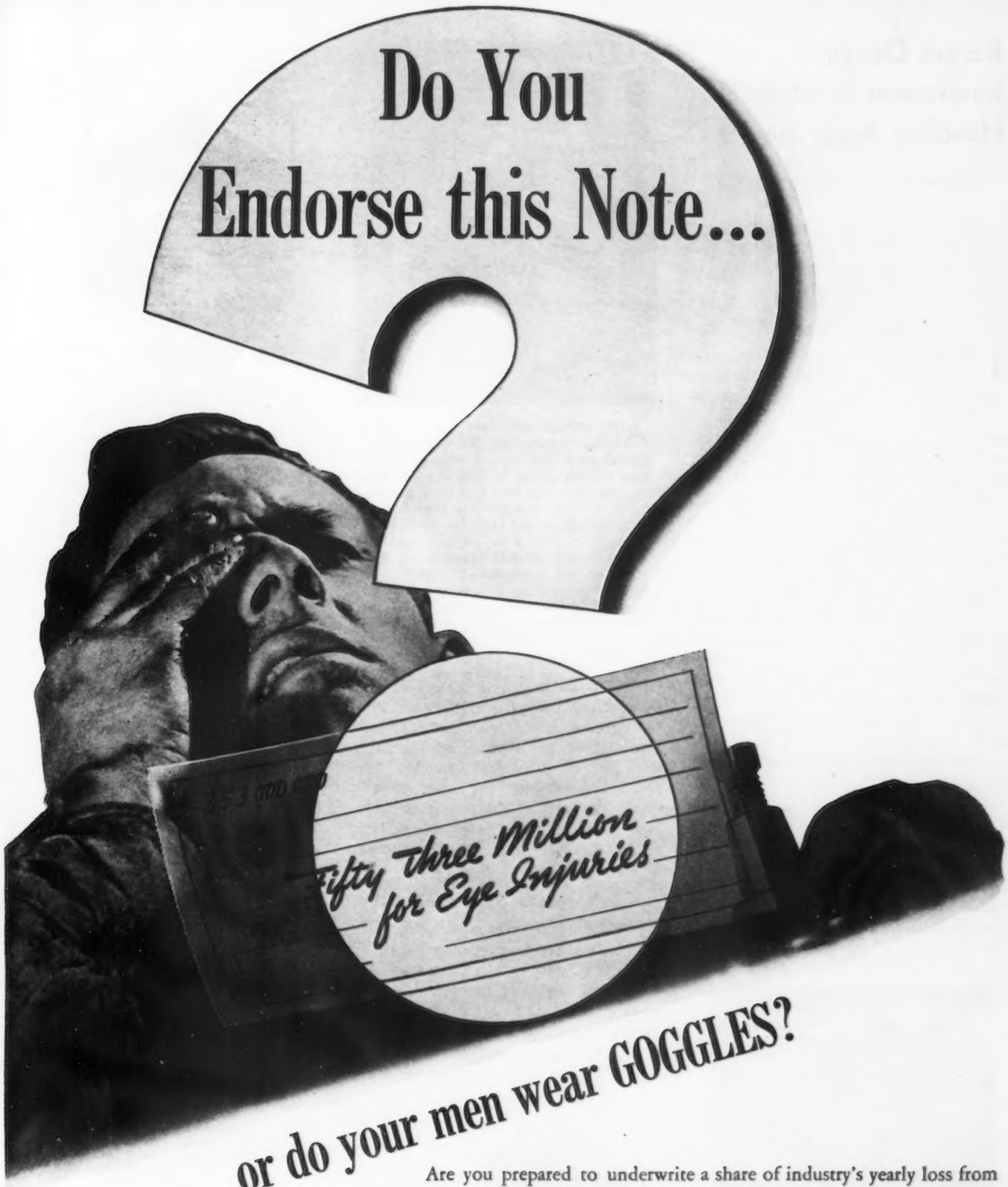
Nova Scotia Light & Power Co., Ltd., Halifax, N. S., has arranged a bond issue of $1,000,000, proceeds to be used for hydroelectric power development at Cowie Falls, including generating station and transmission lines for power service for mill of Mersey Paper Co., Ltd., Brooklyn, N. S.

Washington Chemical Co., Ltd., London, England, a subsidiary of Turner & Newall, Ltd., London, has let general contract to Austin Engineers Builders, Ltd., London, affiliated with Austin Co., Cleveland, for new plant on 70-acre tract at Washington Station, Durham County, England, consisting of two main one-story units, 88 x 460 ft., and 44 x 120 ft., for production of insulating products. A traveling crane and other mechanical-handling facilities will be installed. Cost about $125,000 with machinery.

Wheeling Corrugating Erects Office Building

ST. LOUIS.—Construction of a 130,000 sq. ft. warehouse and office building for the Wheeling Corrugating Co. has been launched here. The two-story office section will be characterized by four large show windows equipped with turntables for revolving displays. Glass block will be used extensively in the facade.

Do You Endorse this Note...



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AMERICAN OPTICAL COMPANY

FACTORIES AT SOUTHBRIDGE, MASSACHUSETTS

Recent Design Innovations in Material Handling Apparatus

(CONTINUED FROM PAGE 53)

locked at any height. Standard lift is 3 in. and optional lifts run up to 7 in.

Several other types of hand lifting trucks are also illustrated.

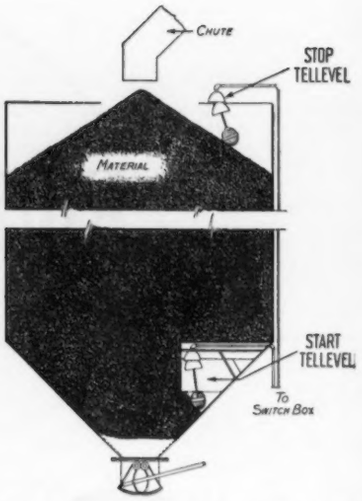
Stacking Boxes

IMPROVEMENT in the corner reinforcement of its steel stacking boxes and stack units has been made by the *All-Steel-Equip Co., Inc.*, Aurora, Ill. The new corner reinforcements are 12-gage drawn steel pieces, in angle form, which are locked and welded in position under the hem at the top corners of the boxes, thereby avoiding the tendency of boxes to open up and spread at the corners. On the stack units, a design feature is the construction of the bin-type front in which the front rim angle and the two front corner reinforcements are formed from a single 10-gage piece spot welded to the sides and gas welded to the bin opening. These units are for handling and storing small parts in processor assembly work and may be staked upon each other without danger of toppling.

Belt Conveyor Idler

A LOW-PRICED troughed antifriction idler for belt conveyors handling material of medium weight and small size has been developed by *Link-Belt Co.* for conveyor widths of 14 to 24 in. The idler rolls are made from smooth steel tubing, 4 in. in diameter, with formed heads pressed into and welded to each end and fitted with grease-sealed ball bearings. As the space between the rolls is very small, creasing of the belt is unlikely. Easy handling and erection are afforded by the light all-steel construction of the entire unit.

ADD-A-BIN units are made in two series, which may be assembled as shown, or in any other combination. The 3-in. bins are all 2½ in. deep and 3, 6 or 9 in. wide, while the 4-in. bins are 3 in. deep and 4, 8 or 12 in. wide. For storing small parts like screws and bolts, the bin is tilted forward for removal of an item, and the weight of the contents causes it to close when the hand is released. The bin housing may be screwed to a wall or cupboard. These units are being introduced by the Noggle Products Co., Ann Arbor, Mich.



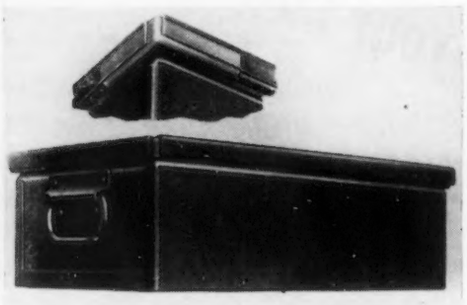
CONTROL of level of material in bins is accomplished by the Tellevel, made by the Stephens-Adamson Mfg. Co., Aurora, Ill. Operation is normally entirely automatic by starting or stopping the conveyors or elevators feeding the bin. The Tellevel consists of three mercury switches in series, with a cast aluminum housing having a bakelite sphere extending downward. The sphere is contacted by the material as shown, and two controls can be used for starting and stopping the material flow respectively.

Magnetic Separators

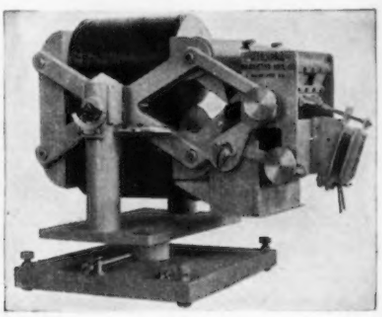
THE *Stearns Magnetic Mfg. Co.*, Milwaukee, has recently improved its spout type automatic separator with a quick release plate feature, thus permitting rapid disposal of accumulated tramp iron.

The *Stearns* company has also designed a new type of magnetic separator, known as style KS, illustrated, in which moving elements such as conveyor belts and rolls have been eliminated and the number of bearings reduced to a minimum. The required number of fields can usually be incorporated to provide complete separation in one operation. The rate of flow and type of separation are made adjustable and the magnetic fields can be adjusted to varying degrees of magnetic intensity. Standard windings include voltage up to 250 and provision is made for placing ammeters in the winding circuits so that results can be duplicated when changing from one material to another. The apparatus is useful for separation of minerals and ores as well as in processing materials in industry.

LEWIS-SHEPARD has developed a special truck for handling heavy cylinders of chlorine, ammonia, etc. By means of a special frame and clamp device, the operator can pull a tank from a storage line and lock it to the carrying frame. A rocker on the frame makes "breaking-over" easy. In the carrying position, the tank is in balance so that little effort is required to propel the truck, particularly since large diameter wheels with roller bearings are used.



ALL-STEEL-EQUIP stacking boxes now have extra corner reinforcements to prevent opening up of the corners and spreading of the sides.



THE Stearns type KS magnetic separator provides for definite regulation of each magnetic field so as to afford complete separation of material in a single passage through the unit.